

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## Andrew Kloman.

We have pleasure in presenting herewith a portrait of the late Andrew Kloman, of Pittsburgh, whose death was announced in our issue of December 23, 1880. Mr. Kloman was one of the ablest ironmasters the country has produced. Our engraving is made from a portrait painted some 10 years ago, but it is the best we could obtain, and we have no doubt it will give a great deal of pleasure to Mr. Kloman's friends.

Andrew Kloman was born at Treve, Prussia, August 25, 1827. He received early in life only such rudimentary education as the free schools of Germany afforded, and was, at the age of 12 years, called upon to assist his father, who was *Waltzmeister*—i. e., superintendent of rolls, at the large iron works at Marien-Hütte. But as his parents both died before Andrew had reached the age of 18 years, he came to America, where he thought his talents and mechanical skill could be turned to better account. He landed in New Orleans on Christmas day, 1845, penniless and almost friendless. Learning that Pittsburgh offered superior inducements for a mechanic, he went to that city in the spring of 1846, and after enduring considerable hardship, because of his ignorance of the language, he at last obtained employment in the old Novelty Works, which manufactured locks and a general line of small hardware. This work being ungenial to his tastes, he soon left and obtained a situation in the steel works of Singer, Hartman & Co., where his mechanical skill and industrious habits soon gained him favorable recognition, and he was entrusted with the responsible work of finishing and testing steel wagon springs. He won his way rapidly to the good opinion of his employers, and was acknowledged to be the foremost workman of the place. By working early and late and economizing his earnings, he saved enough money in a few years to enable him to start in business for himself, and in the year 1853 he began in a very small and modest way, by erecting a forge and doing the work himself, with the assistance of his elder brother, who had already earned a reputation as a first-class hammerman. This was the beginning of what was twenty years later one of the most powerful and extensive concerns in this country. The inventive genius and progressive spirit of Andrew Kloman now began to assert themselves, and step by step he discarded almost all of the traditions of his trade, and devised original machinery and methods for doing everything required in his business.

The outbreak of the war created a great demand for axles, and he invented a new method for making the pile from which the axles were to be hammered. This consisted in making a bundle of 1-inch square bars, bound closely together, with the direction of their fibers alternately reversed. This made such a superior axle, that the "Kloman" brand was soon widely known and eagerly sought after.

About this time the two brothers separated, and Andrew Kloman associated with himself in business Mr. Henry Peipps, and they together built the large mill in the Twelfth Ward in Pittsburgh, now owned by Wilson, Walker & Co. He turned his attention to rolled shapes, and made many improvements in their designs, and in the machinery for rolling them. Fortune favored the firm, and it was so prosperous that in 1864 they consolidated with the owners of the Cyclops Mill, and formed a stock company to operate both mills, under the name of the "Union Iron Mills." Andrew and Thomas M. Carnegie principally owning the additional stock. Mr. Kloman, in pursuit of his business, invented many new devices and machinery, chiefly among which were the cold saw, and a straightening machine which involved a new mechanical motion. This consisted in shortening and lengthening at will the stroke of a piston driven by a cam movement. Concerning the cold saw, although Mr. Kloman was undoubtedly the first man to apply this principle to cutting iron cold, yet he was too honest to claim the invention as his own and to patent it, as he might well have done. Mr. Kloman admitted that he had conceived the idea from seeing the European watch makers cutting small spur wheels out of brass disks, by bearing them against rapidly revolving steel disks of the size of a penny. He now began making improvements in the art of rolling beams and other shapes, and brought all of these to a high state of perfection.

When Captain Eads was pushing the St. Louis bridge to completion, he desired to obtain a reliable coupling for the steel tubes which form the arches of the bridge. After experimenting with cast steel for some time, he abandoned it and decided to try wrought iron; but the shape was enormously larger—much larger than anything before attempted in this country—and he doubted the ability of any American mill to produce it. In his dilemma he was referred to Andrew Kloman, who examined the drawing of the shape carefully, and promptly said that he could make it if they could pay enough to justify the necessary expenditure. The price was agreed upon, and in a short time the rolls were ready and the largest rolled shape ever made in this country was successfully produced. Its width in the rolls was about 30 inches. Every individual coupling was subjected to a severe proof strain before being used.

It had always been the settled policy of

Mr. Kloman to turn his attention more particularly to the manufacture of special shapes which were not generally offered for sale by the trade, and his mechanical skill enabled him to carry out successfully every one of these attempted by the firm. The increased demand for steel and iron in bridges and large structures, led him to turn his attention more particularly in this direction, and the firm soon enjoyed such a trade that extensive additions to their works were made in the year 1871. In this year, also, the Lucy Furnace No. 1 was projected and built, under the immediate supervision of Mr. Kloman, who introduced into its construction many original ideas, making it, when finished, the most complete blast furnace which had been built up to that time. He divided his time between this furnace and the mills, and, in his investigations concerning the running of the furnace, soon abandoned many of the old traditions of the trade. He conceived the idea of abandoning the pressure gauge to indicate the proper amount of blast, and introduced the new feature of regulating the inflow of the blast entirely by the revolutions of the blowing engines. This idea of regarding only the

and failed for a very large amount of money, compelling Mr. Kloman to sell out his interest in all other business for the purpose of satisfying the creditors of the Escanaba Furnace Co. and the Cascade Iron Co. His straightforward and manly course in this matter deserved and received the praise of the commercial world. He came through the affair with an empty purse, but with an undiminished reputation and an undamaged credit.

Under these circumstances he was compelled to begin life anew, which he did with remarkable cheerfulness of disposition and unimpaired energy. During the settlement of his affairs, he had conceived the notion of making eye bars for bridges by some method which would insure a higher state of perfection than had yet been reached, and with his usual clear foresight, he perceived that the demand for steel in such structures would soon become very great. He set himself, therefore, to devise some method by which steel eye bars could be made. He succeeded in bringing out the new system of rolling weldless eye bars. The process of manufacturing them and the machinery with which they are rolled were fully de-

suddenly overtaken with an incurable disease of the liver, mainly superinduced by mental worry and overwork. After vainly endeavoring to obtain relief and seeking advice of many eminent physicians, he finally succumbed and was confined to his house, where in three weeks he gradually sank, until, on the 19th of December, 1880, he died. His death was easy and painless. He was generous to almost a fault, and his simplicity and correctness of life made him a general favorite. He has left behind him monuments more enduring than stone, and in his death the workmen of Pittsburgh and vicinity have lost their best friend and society in general a useful member.

## SCIENTIFIC AND TECHNICAL.

Mr. G. F. Ansell, whose death is just announced from England, recently applied the principle of his fire-damp indicator in the production of a handy little instrument for

### DETECTING GAS LEAKS.

The action of Mr. Ansell's fire-damp indicator is founded on the fact that different

out. The hat is then shown to be intact. He pours some of the liquid on the floor and on a handkerchief and lights it. The floor and the handkerchief are noways damaged. Some drops may be put in the hollow of one's hand and burnt without producing appreciable pain. These extraordinary facts are readily explained. Herr Kordig's mineral essence boils at about 35° C., and the tension of its vapor is considerable, so that it is not the liquid that burns, but its vapor. He states that the liquid is a very volatile essence of naphtha, with a certain mixture of ether of its composition added. The new essence is said to be obtained quite simply from natural oil beds recently discovered in Hungary, and the cost is low. The liquid has a slight smell of petroleum, and produces on the hand a cold sensation like ether.

Herr von Krasper recently exhibited, before the Buda-Pesth Academy,

### A NEW BALANCE.

designed for use by Hungarian officials in the inspection of weights. The prism-shaped steel bed, on which the middle knife-edge rests, is easily drawn out with the finger from the swallowtail shaped rollers, between which it is passed in the body of the balance. The beam can thus be easily removed and replaced. Each weighing scale hangs on a conical point, and the stopping and raising arrangement is contained in a horizontal frame. Great accuracy in the readings is obtained by substituting for the pointer an optical arrangement on the beam, consisting of two achromatic glass prisms, which render parallel the rays from opposite directions and send them to a telescope placed before the balance. At the two sides of the balance two scales are set (but on the walls of the room); the images of these scales move in the field of the telescope beside each other in opposite directions, and so the corresponding divisions can be read off. These readings are independent of vibrations of the telescope, and are much more exact than those with telescopes and cross threads, not to speak of the common pointer. The arrangement also permits of the center of gravity of the balance being placed lower, the stability increased, &c. The weight of the balance is about 44 pounds, though both scales can carry 44 pounds weight.

Prof. Wickersheimer, who recently sold his process for preserving organic substances to the Prussian government, has patented

### A PROCESS FOR PRESERVING MEAT

for eating purposes. A solution (heated to 50° C.) of 36 grams potash, 15 grams common salt, and 60 grams alum, in 3 liters of water, is mixed with a second solution of 9 grams salicylic acid in 45 grams methylic alcohol, to which 250 grams glycerine is added. With this liquid the animal to be preserved is injected. In the case of small animals, 100 grams of the liquid for every 1 kilo. body weight, is recommended; in larger, the proportion may be reduced to 40 grams. Fishes, birds, and such small animals are not previously killed, but the injection made direct into the heart with a syringe having a sharp canula. Large animals are injected immediately after slaughtering, the liquid being introduced by one of the large cervical arteries. For cattle and swine, 2 to 3 grams saltpeter is added to the liquid. The flesh of animals so treated keeps (it is said) two to three weeks perfectly good and inodorous. If the preservation is to be for a longer time, the proportions of methylic alcohol, salicylic acid and glycerine are somewhat increased.

## The Production of American Steel Works in 1880.

So much interest has been expressed recently in the work of American steel mills during the past year, that the following data, for which we are indebted to the courtesy of the managers of the respective works, are timely:

In the converting department of the North Chicago Rolling Mill Company, at Chicago, the best day's work made during the course of the year was 531.73 gross tons in 84 heats; the best week's work, 418 heats, or 2645 tons, and the best month's work, 1683 heats, or 10,890.69 gross tons. The two 6-ton converters of the establishment turned out during the year, in all, 11 turns per week, 100,178.88 gross tons of ingots. In the steel-rail mill, 444.37 gross tons, or 2000 rails, weighing 50 pounds per yard, were rolled during the best day, 232.68 tons during the best week, 9235.41 during the best month, and 84,845.58 during the entire year.

The Lackawanna Iron and Coal Company, at Scranton, with two 5-ton converters, produced 105,354 gross tons of ingots during the year, and turned out, as finished product, 84,361 tons of rails and 228 gross tons of merchant steel.

The Joliet Steel Company, with two 6½-ton converters, produced 116,000 tons of ingots and 97,000 tons of rails.

The Edgar Thomson Works, as we have already reported, succeeded in casting from their two 7-ton converters 123,303 tons of ingots, and in rolling 100,094 tons of rails and producing 4263 tons of merchant steel.

The Thomas dephosphorizing process is being used in the open-hearth at Creusot, France.



ANDREW KLOMAN, OF PITTSBURGH.

volume of the blast and making the pressure a secondary matter, was entirely an original idea with him, and is now universally adopted.

He also invented and patented a rotary table, carrying a series of cooling boxes for the purpose of receiving slag from the furnace, forming it into cakes of convenient size for carrying off from the furnace, thus economizing much of the space about the furnace and avoiding the inconvenient and unsightly mess usually made in running slag out on the ground.

The universal mill for rolling heavy and long bridge plates next received his attention. He introduced this feature into the Union Iron mills with his usual success. Perceiving the economy of reversing the mill, he devised and built an ingenious clutch for alternately reversing the motion of the mill, while the large engine run in one direction only. This invention was fully described in *The Metallurgical Review* and in *The Iron Age*.

In 1872, Mr. Kloman, in connection with Joseph Kirkpatrick, Wm. Bagaley, Wm. Smith, and several other prominent iron manufacturers, purchased a large tract of land in the Lake Superior region, and built a charcoal furnace of 14 feet bosh, at Escanaba, and developed the Cascade mines. Although the mines promised very richly at first, and the furnace was a model one of its kind, yet this venture finally proved his financial ruin; his own business at home demanded almost his exclusive attention, and not being able to watch either business as he should have done, and the panic coming on so soon after the venture had been started, they became financially embarrassed in 1874,

scribed in *The Iron Age* of April 24, 1879, and the merits of this process were so quickly recognized, that Mr. Kloman was soon again engaged in extensive manufacturing operations, confined largely to steel for bridge structures. In the fall of 1878 he leased the old Superior Mill in Allegheny City, and put in his machinery for rolling plates and eye bars. He made the tension members for the Glasgow (Mo.) bridge, the first all-steel structure ever erected in this country, which was followed by the steel superstructure for Niagara River Suspension Bridge, and the all-steel channel span of the Plattsburgh bridge.

But the cares of business and the death of his wife in the spring of 1879 began to depress his mind, and he suffered much from ill health for the last year and a half of his life. Notwithstanding this, he still attended closely to his business, and in the fall of 1879 he projected the erection of a mill of his own, where he could carry on the manufacture of steel structural material in a more satisfactory way. Other prominent steel manufacturers of Pittsburgh, recognizing the fact that the demand for structural steel was rapidly increasing, and that their own facilities for furnishing such steel were inadequate, thereupon decided, mainly through the instigation of Mr. Kloman, upon the erection of a new Bessemer plant. Mr. Kloman determined to erect his mill contiguous to and in connection with this new enterprise. A site was selected near Homestead, adjoining the Pittsburgh city poor farm, on the Monongahela River, and the work of erection was pushed as rapidly as possible. In the midst of a busy life and a career of usefulness, Mr. Kloman was

gases have different rates of diffusion through a porous body, the velocities of diffusion being inversely as the square roots of the respective densities of the gases. In the gas-leak indicator this property is taken advantage of as follows: A small chamber is provided, having its back formed by a disk of terra-cotta, this chamber being provided with a small stop-cock, by which its interior can be placed in communication with the outer air. If, when this stop-cock is closed, the indicator be taken into a room where a gas leakage exists, the gas, in virtue of the above-named law of diffusion, enters the chamber through the terra-cotta disk more rapidly than the inclosed air escapes, and the pressure in the chamber consequently rises. This increase of pressure is utilized to move a hand on a dial at the front of the instrument, each pressure corresponding to a certain percentage of gas in the atmosphere in which the indicator is placed. The dial is graduated from 0 to 35 per cent. of gas, and is moreover marked to show when the mixture is and is not explosive. The instrument is very sensitive and prompt in its action, and it is calculated to serve a very useful purpose.

Herr Kordig, a Hungarian, has lately been performing some very curious experiments at scientific meetings in Paris with

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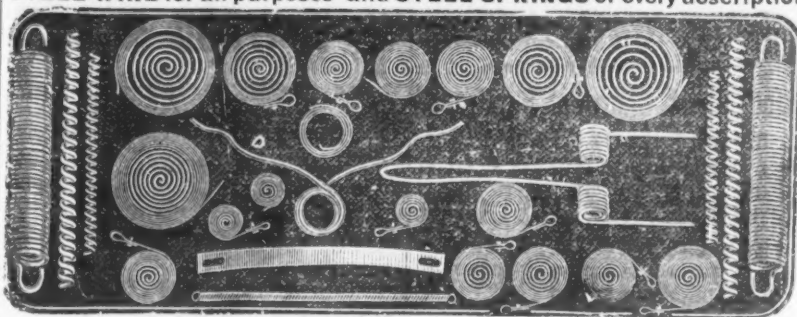
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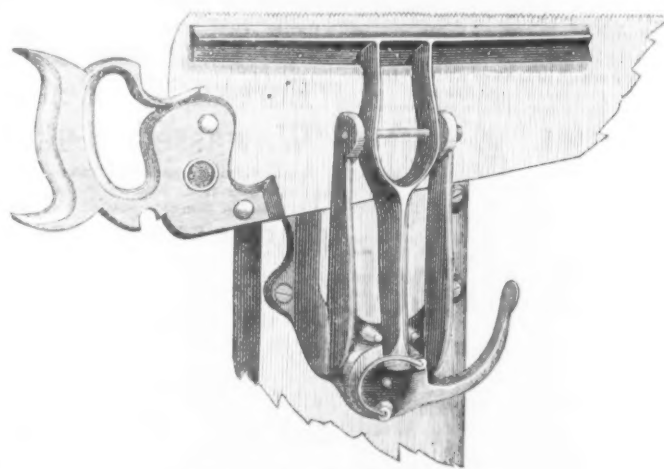
Black and Galvanized Sheet Iron, Metals, Wire, Copper,  
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**Wentworth's Improved Saw Vise.**

The accompanying engraving illustrates what is known to the trade as Wentworth's patent saw vise. It is constructed with a flexible rubber cushion or muller between the jaws, which prevents any vibration during the process of filing, and, therefore, renders the operation noiseless. By its use that terrible screeching, usually attendant upon saw filing, is entirely overcome. The

depth for tonguing may be regulated by means of the set-screw, which will secure the iron gauge at any point on the upper part of the spindle of the ordinary gauge D. The grooving may be done with the regular  $\frac{1}{4}$ -inch plow bit.

Enough of these tools have already gone into the hands of mechanics to make full test of their merits, and they gain the approval of all who try them. The price of the tool entire, ready for use, is \$7. They



WENTWORTH'S IMPROVED SAW VISE.

jaws of the vise are 10 inches long, and are made to open and close by simply turning a cam lever, which is shown in the engraving. This lever is so arranged that it will hold the jaws open at any position, as well as fasten them shut. In use it is secured to a work bench by screws, or, instead of being attached to the bench, may be put up in any place desired. The manufacturers' agents are Messrs. C. N. Marcellus & Co., 69 Varick street, New York.

are manufactured by the Stanley Rule and Level Company, of New Britain, Conn., and are sold by all hardware dealers.

**The Hardware Trade of Chicago in 1880.**

The *Chicago Tribune*, in a review of the business of that city during the past twelve months, says of the hardware trade:

The season has been a varied and excited one for hardware. In the first part of the year the "boom" that developed in the preceding fall was strained to its utmost, and finally broke in the spring, demoralizing the market for a time. As soon as order was restored the demand revived, and trade during the past six months has been continuously heavy. For the year jobbers estimate an increase in the tonnage sold of 33, and some say 50, per cent. The business of the past eight months has been done partly on a falling market, yet it has been fairly remunerative. The gain in territory by the Chicago trade has been principally in the direction of Dakota, Wyoming, Colorado and New Mexico. All the older sections have bought more heavily than in late

**Adjustable Dado, Filletster Plow, Etc.**

This tool embraces, in small space, an ingenious combination of several tools, which in the old form would nearly fill a carpenter's chest. The parts being made of iron or steel, no change in form can result to them from weather or other cause, and no amount of use can wear them out. The tool, which is represented in Fig. 1, consists of two sections—a main stock, A, with two bars or arms, B, and a sliding section, C, having its bottom or face level with that of the main stock.

It can be used as a dado of any required width by inserting the suitable bit into the

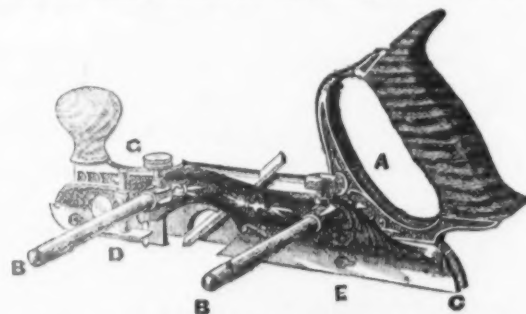


Fig. 1.—Traut's Adjustable Dado, Filletster, Plow, &c.

main stock A, and bringing the outside edge of the sliding section C into line with the bit. The two steel spurs, one on each section of the plane, will thus be exactly in line with and in front of the two edges of the bit. The gauge D on the sliding section, regulates the depth to which the tool will cut.

If the tool is to be used as a plow, remove the gauge D, for regulating the depth of cut, to the socket on the right-hand side of the main stock A at G. The guard-plate H (Fig. 2) should be attached to the sliding section C by means of the thumb-screws F. The flanged ends of the thumb-screws F are



Fig. 2.—Guard Plate to Traut's Adjustable Dado, &c.

passed from the outside through the slots E in the sliding section C, and by giving these screws a turn to the left, the two parts will be firmly secured together, and their inside faces be exactly flush with each other, thus forming a fence for the plow. Insert such bit as is needed in the main stock A, and secure the fence at any desired point on the bars, by use of the brass thumb-screws above.

A filletster may be had by detaching the guard-plate H (Fig. 2) and turning it end for end. The thumb-screws F must be reversed, so as to bring their heads on the outside of the sliding section C, and the flanged end of each screw will then have its bearing in the recess on the inside of the slots E. Then tighten up the screws, and a fence will be formed for regulating the width of cut, while the parallel bottoms or faces of both sections will be left so as to rest on the work. With the  $\frac{1}{16}$ -inch cutter inserted in the main stock, the fence may be moved and secured so as to give any required width of cut, from  $\frac{1}{16}$  to  $\frac{1}{2}$  inch.

As a matching plane, the fence is used in exactly the same form as on the filletster; the heads of the thumb-screws F are on the outside, and the parallel bottoms or faces of both sections rest on the work. Insert the tonguing tool in the main stock A, and slip the extra iron gauge, which accompanies each tool, on to the upper end of the spindle of the ordinary gauge D, when inserted in the socket on the right-hand side of the main stock at G. The hooked form of the iron gauge will give it a bearing directly on top of the tongue when the full depth is reached, and the required

years. The year closes with the business apparently in a sound and vigorous condition. The speculative tendencies are now believed to be completely obliterated, and nobody wants to see another such mania. The trade does not want to have prices pushed up again to a point that invites free importations. The total sales of articles under this head foot up \$30,000,000, against \$24,500,000 in 1879.

The sales of shelf hardware, cutlery, metals, nails and cognate lines are estimated at \$15,000,000—an increase over 1879 of 25 per cent. The capital is raised to \$4,500,000. The year was less profitable than 1879, but, taking the season through, the profits exceeded the losses by a respectable sum. The general market was early very sensitive to every change in iron, and most staples advanced with that metal during January and February. When the crash came in iron, hardware was quick to follow, and was not very steady before August, when prices were nearly as low as they had been before the big advance of the previous fall. The break had a stunning effect early, but after confidence was restored business assumed a healthy tone in every department. The money that was made in the first two months of the year, when the boom was at fever heat, was largely wiped out in the next four; but in the past six months trade has been uniformly heavy and fairly satisfactory to jobbers and all concerned in it. The early losses fell largely on speculators, though merchants, of course, had to replenish stocks at high figures, and lost as well.

Nails opened at \$4.50 rates, and were advanced by factory men to \$5.25 to \$5.50 in this market, which followed the changes in the Pittsburgh card. They tumbled with iron, and the decline was accelerated in the spring by the pressure on the market of large lots that had been held by speculators. Competition from the big mill at South Chicago has helped to cheapen nails. The market declined to \$2.80—more than 48 per cent. from the highest rate—and closed steadier at \$3 rates, with stocks reported not large at any place. Trade in nails during the year was large, the business of the first two or three months being heavy.

In heavy hardware and iron the tonnage sold was 20 to 25 per cent. greater than in 1879. The market was greatly disturbed early. The great iron boom that started in July of the previous year continued through the first three months of 1880, and exhibited symptoms of weakness a little before April 1, in consequence of the heavy importations from Europe. As soon as it became evident that the boom had spent itself, large speculative lots were thrown out, and these, with the big imports and the large output of do-

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Anvil Brand Refined Merchant Bar Iron.  
Also, the James Rowland & Co. Kensington Nails, cut from their  
Refined Anvil stock. Also, Plow and Cultivator Steel, Rounds,  
Squares, Flats, Bands and Hoop Iron.  
Correspondence with Dealers solicited.

**PENCOYD IRON WORKS.**  
**A. & P. ROBERTS & CO.,**  
Manufacturers of  
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**BAR, ANGLE, TEE AND CHANNEL IRON.**  
Office, No. 265 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

**MANUFACTURERS OF**  
**FOUNDRY FACINGS.**  
AND  
**FOUNDRY SUPPLIES.**  
**MOULDING SAND**  
A SPECIALTY.  
Albany, Crescent, Tullytown and Lumberton Sands.

**GERMAN LEAD, BITUMEN, SIEVES, MACHINERY SAND,**  
**AMERICAN LEAD, ANTHRACITE, SHOVELS, BRASS SAND,**  
**PLUMBAGO, CHARCOAL, BRUSHES, CHANDELIER SAND,**  
**STOVE PLATE, MINERAL, CRUCIBLES, STOVE PLATE SAND,**  
**J. W. PAXSON & CO.,** Office and Store rooms:  
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Manufacturers of  
Rails, Bars, Axles, Shafting, Fish Bars (Plain and Angle), Spikes,  
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General Office, 237 South Third St., Philadelphia. Works at Allentown, Pa.  
**JAMES C. BOOTH, THOMAS H. GARRETT, ANDREW A. BLAIR.**  
**BOOTH, GARRETT & BLAIR,**  
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Established in 1830.  
Analyses of Ores, Waters, Metals and Alloys of all kinds - A special department for the  
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Fitted with all the apparatus and appliances for the rapid and accurate analysis of Iron, Steel, Iron  
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Price lists on application.

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Iron Ores.**  
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208 South Fourth St., Philadelphia.  
Sole agents Glasgow Iron Co. and Pine Iron Works  
manufacturers of Muck Bar and all grades of Plate  
Iron. Celebrated "Glasgow" and "Pine"  
brands for fire boxes and difficult flanging. Pig and  
Bar Iron, Rails and all shapes in iron. Quotations  
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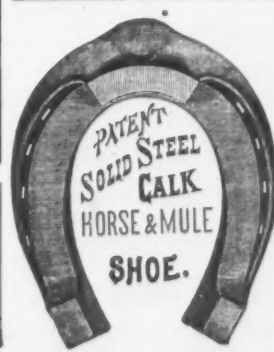
**WROUGHT IRON**  
**Boiler Tubes,**  
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**Oil Well Tubing, Casing and  
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Cotton Presses, Forgings,  
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Selling Agents and Commission Merchants  
For the sale of  
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IRON.**  
No. 333 Walnut St., Phila.  
Charcoal Bloom and Pig a specialty.

**LOGAN IRON AND STEEL CO.,**  
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**GREENWOOD & EMMA C. B. C. PIG IRON,**  
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Works at Lewistown, Pa., and Greenwood, Pa.

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Sole Agent for the Sheridan and Leesport Furnaces.  
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Dealers in  
**Scrap Iron & Metals, Machinery, Tools,  
Shafting & Pulleys, Steam Engines,  
Pumps & Boilers, Copper, Brass,  
Tin, Babbit Metals, Foundry  
Facings. Best Quality Ingot Brass.**  
Cash paid for all kinds of Metals and Tools.

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216 South 4th St., Philadelphia. 52 Wall St., (Room 8) New York.  
Selling Agents  
**ATKINS BROS'S-BEAMS, CHANNELS, RAILS, &c.**  
**A. & P. Roberts & Co.-Car Axles, Plates, Channels, Tee,  
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**WILLIAM McILVAIN & SONS-Boiler, Ship and Bridge Plates.**  
**BERWICK R. M. BARS AND SHAPE IRON.**  
Advances on Consignments of Old Material and sales promptly made.



**BRADLEE & CO.**  
EMPIRE CHAIN WORKS,  
Keystone Horse Shoe Co.,  
816 Richmond St., Philadelphia, Pa.  
Manufacturers of all kinds of Chains. Also of the Keystone Patent  
Solid Steel Calk Horse and Mule shoes.  
These shoes are made of superior iron, completely finished  
and ready for cold shoeing; have clip and solid steel calks. The  
holes are punched through at the proper angles and free from  
burrs. Same number of Shoes per keg as in kegs of unfinished  
shoes.  
We wish to call particular attention to our D. B. G. special  
Crane Chains, made of an extra brand of reworked iron, unit-  
ing great tensile strength and wear, fully tested and war-  
ranted in every particular superior to the very best brands  
of English Crane Chains, and specially adapted for rafting,  
mining and dredging.

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**JUSTICE COX, JR. CHARLES K. BARNES.**  
**JUSTICE COX, JR. & CO.,**  
AGENTS FOR  
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**Foundry & Forge Pig Iron.**  
**CATASAUQUA MFG. CO.'S**  
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Also celebrated "Brotherton" Ore.

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**SPIEGELEISEN,**  
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**NEW AND OLD RAILS,**  
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Bankers and Stock Exchange Brokers,  
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**LOCOMOTIVE AND CAR WHEEL TIRES,**  
Manufactured from the celebrated OTIS STEEL  
BRAND  
**STANDARD.**  
Quality and efficiency fully guaranteed. Prices as  
low as any of the same quality. We manufacture  
Heavy and Light Forgings, Driving and Car Axles,  
Crank Pins, Piston Rods, &c.  
Works at Lewistown, Pa.  
Office, 220 S. 4th St., Philadelphia, Pa.

**LANGHORNE WISTER, RODMAN WISTER.**  
**L. & R. WISTER,**  
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Agents for the Clearfield Fire Brick Co.'s  
Fire Bricks.  
No. 230 South 4th St., Philadelphia.

**FRANCIS WISTER,**  
Sole Eastern Agent for  
**A. A. HUTCHINSON & BRO.**  
**CONNELLSVILLE COKE.**  
**ORES, Native and Foreign.**  
230 South Third Street, Philadelphia.

**Italian and Spanish**  
**CHARCOAL IRON,**  
CHILL-GRADED,  
**For Car Wheels, &c.**  
FOR SALE BY  
**ALFRED EARNSHAW,**  
203 Walnut Place, PHILADELPHIA.

mestic manufacturers, soon glutted the mar-  
ket. From April to August prices had de-  
clined 45 to 50 per cent., reacting in Septem-  
ber; this change was not sustained, but  
rates advanced in December. The highest  
rate on common bar iron was \$1.40 early in  
the year, and the lowest \$2.20 to \$2.25 in  
summer; the present rate is about \$2.50.  
Money was made rapidly and in big sums in  
the first quarter, but a good deal of it was  
lost in the subsequent heavy shrinkage.  
The trade, having made contracts long  
before the boom had reached its height, did  
not shoulder the full burden of the declin-  
ing market. The enormous demand from rail-  
roads has doubtless prevented iron from de-  
clining still more. The railroads have used  
a larger quantity of iron the past season  
than in any former one. The general de-  
mand has been unusually heavy, extending  
through December even, and the tone now  
is strong, with manufacturers refusing to  
make contracts for spring delivery except  
at higher rates. The market is now believed  
to be in a healthy condition. It is not ex-  
pected that the protectionists will run prices  
of iron up again very soon to a point that  
will permit free importations from all the  
exporting countries.

Nearly all the heavy goods sympathized  
with iron. Steel declined, and is at present  
nearly down to the prices that ruled prior  
to the bulge. The best American tool steel  
is now 12½ to 13 cents per pound. Owing  
to a sharp fight among manufacturers, bolts  
of all kinds are sold for nearly the cost of  
production. Carriage bolts were billed at  
60 per cent. off early, while now the dis-  
count is 80 per cent., which makes them  
just one-half the price of the first part of  
the year. Wood or wagon stock has ad-  
vanced steadily, owing to its growing scar-  
city. The Western iron mills now furnish  
most of the stock that is sold here. The  
difference in freight enables them to under-  
sell Pittsburgh, which is now depended on  
chiefly for light sizes. The sales of iron,  
heavy hardware, wagon stock and railroad  
supplies, excepting rails, are estimated at  
\$10,000,000, and the capital employed at  
\$3,000,000.

The dealers in saddlery hardware report  
an active country demand for goods, espe-  
cially from the West; and a marked change  
for the better in the city trade, especially  
in harness goods. Winter articles have  
been a little slow, owing to the fact that  
retailers had stocked up heavily the pre-  
vious autumn, and carried a good many  
goods over to this season. These goods  
generally felt the effects of the iron boom,  
advancing about 50 per cent. from the low-  
est range in the previous year, and reced-  
ing 25 per cent. subsequently. In saddlery  
and harness goods there are four houses.  
The competition is sharp, and the market  
is a very popular one with buyers, who  
have almost forsaken New York and other  
Eastern headquarters. One factory is run-  
ning here successfully, and there appears  
to be room for others. The three cabinet-  
hardware houses increased their business,  
and prices were quite steady after the early  
decline. The sales of saddlery, harness,  
cabinet goods, &c., approximated \$2,000,-  
000.

**Scientific Terminology.**-Monstrosities  
of diction, says the London *Globe*, are not  
confined to chemical science, but are to be  
found in physics as well as metaphysics.  
We recently gave some samples of the ex-  
traordinary and absurd length to which the  
names of certain organic salts had grown,  
and we may now add the following choice  
specimen of imagery (from a recently pub-  
lished paper by Sir William Thomson) to  
illustrate the grand style in modern natural  
philosophy. "The stream lines" says the  
distinguished Glasgow physicist, "are rep-  
resented in the diagram, in which the  
region of translational-velocity greater than  
wave-propagational velocity is separated  
from the region of translational-velocity  
less than wave-propagational velocity by a  
cat's-eye border pattern of elliptic whorls."  
The curious mixture of homely simile and  
abstract terminology in this passage is highly  
ludicrous. Its obscurity is, however, sur-  
passed by Mr. Herbert Spencer's famous  
"Formula of Evolution," which runs:  
"Evolution is a change from an indefinite,  
incoherent homogeneity, to a definite, coher-  
ent heterogeneity, through continuous dif-  
ferentiations and integrations," which being  
interpreted into plain English by Mr. Kirk-  
man, the mathematician, means: "Evolution  
is a change from a nowhows, untalk-  
aboutable all-alikeness, to a somehowish,  
and in-general-talkaboutable not-all-alkeness, by  
continuous something-elsefications and stick-  
togetherations." As a clever travesty on  
the above cacophonous mystification of Mr.  
Herbert Spencer, which, like the language of  
diplomacy, conceals the meaning it ought to  
express, we have Mr. Kirkman's "Formula  
of Universal Change," which is: "Change  
is a perichoretal synecyche of pamparag-  
matic and porotetropreumatic differentia-  
tions and integrations." After such  
pedantry as this, the clown in Shakespeare's  
"Twelfth Night" who "did impetuously thy  
gratitude" is absolutely nowhere.

A number of English coal mines are being  
worked under the ocean. In Northumber-  
land the net available quantity of coal under  
the sea is estimated at 403,000,000 tons, and  
on the Durham coast under the sea, includ-  
ing a breadth of 3½ miles with an area of  
71 square miles, 734,500,000 tons. The lat-  
ter mine is in a vein of an aggregate thick-  
ness of 30 feet, distributed in six seams. En-  
gineers are considering how it can be  
worked successfully in the future.

A correspondent of the *Engineer* describes  
a new method for repairing cracks in boil-  
ers invented by a German, Herr Knoelke.  
It consists in the use of a sort of wedge-  
link—a pair of tapered pins connected with  
each other in one solid body by a flat wedge.

In a few days an electric head-light for  
locomotives will be tried on the Cleveland  
and Pittsburgh Railroad. The power will be  
furnished by a small engine placed behind  
the smoke stack and supplied with steam  
from the main boiler.

## A. H. McNEAL & BRO., BURLINGTON, N. J.

Flange Pipes.



General Foundry Work.

## CAST IRON PIPES FOR WATER AND GAS.

ESTABLISHED IN 1845.

## SINGER, NIMICK & CO., PITTSBURGH, PA.

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

## STEEL.

Warranted Equal to any Produced.

### BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

### SAW PLATES

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

### Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws, Stamping Cold, &c., &c.

### SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement is unequalled for surface finish and exactness of gauge.

### ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Flaw Steel.

"Iron Center" Cast Flaw Steel. Finished Rolling Flaw Centers with Patent Screw Hubs attached.  
"Soft Steel Center" Cast Flaw Steel. Agricultural Steel cut to any pattern desired.  
"Solid Soft Center" Cast Flaw Steel. Steel Forgings made to order.

Represented at 59 Beekman St., New York, and 417 Commerce St., Philadelphia, by HOGAN & BURROWS, Gen'l Agents for Eastern and New England States.

## MIDVALE STEEL COMPANY, CRUCIBLE AND OPEN-HEARTH STEEL.

## TIRES and AXLES OF EVERY DESCRIPTION.

A. G. TOMPKINS & CO., Boston  
H. A. ROGERS, New York  
W. H. WALLACE & CO., New York  
C. R. ADAMS & CO., Chicago



Tool, Machinery and Spring Steel  
Castings and Forgings.

Works and Office, Nicetown, Philadelphia, Pa. Warehouse, 12 N. 5th St., Philadelphia, Pa.

## Philadelphia Steel Forge.

STEEL FORGINGS of all descriptions: Axes, Frog-points and plates, Switch plates, Wrist-pins, Connecting-rods, Guide-bars, Piston-rods and all sorts of Railroad Forgings. (For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-blades, Cold-Chisels, and Tools generally.)  
CAST MACHINERY STEEL for Shafting, Spindles, Piston-rods, &c.

GENERAL MACHINERY and MARINE FORGINGS. Works at Frankford Creek, Philadelphia (formerly Baldwin's Steel Works). Address all orders to PHILADELPHIA STEEL FORGE, 315 Willings Alley, Philadelphia, Pa. Send for prices for any work in this line.

ESTABLISHED 1847.

## A. WHITNEY & SONS, PHILADELPHIA,

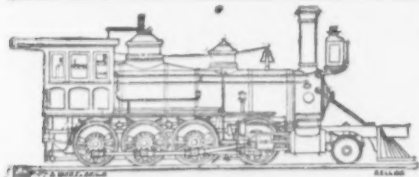
## CHILLED RAILROAD WHEELS

For every kind of service, including Street, Mine and Lumber Tramways. Wheels furnished in rough bored or on axles. Chilled castings made to order.

## PENNSYLVANIA STEEL COMPANY, Steel Rails, Frogs, Crossings & Switches.

Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes. Works at Baldwin Station, Pennsylvania Railroad, near Harrisburg, Pa. Address all orders to

PENNSYLVANIA STEEL COMPANY, 208 South Fourth Street, Philadelphia.



## BALDWIN LOCOMOTIVE WORKS.

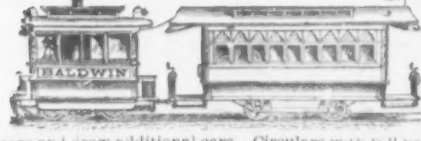
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Manufacturers of  
LOCOMOTIVE ENGINES  
of every description.

Catalogues, photographs and estimates furnished on application of customers.

NOISELESS STEAM MOTORS  
For city and suburban Railways.

These machines are nearly noiseless in operation; show no smoke with the use of anthracite coal; and show no steam whatever under ordinary conditions of service. They can be run at two or three times the speed of horse cars and draw additional cars. Circulars with full particulars supplied.



cars and draw additional cars. Circulars with full particulars supplied.

## ROANE IRON COMPANY, E. S. Wheeler & Co.

Manufacturers of and Dealers in

### Pig and Railroad Iron.

CHATTANOOGA, - - - - - TENN.

### BELLAIRE NAIL WORKS,

## PIC IRON AND NAILS,

Manufacture the Celebrated Brand of

## BELLAIRE NAILS,

Office and Works, Bellaire, Ohio.

PAGE, NEWELL & CO., 139 Milk St., Boston, Mass.

IMPORTERS OF

## SWEDISH IRON.

Bars of every description, Bolt Rods, Nail Rods, Rivet Rods and Wire Rods. SWEDISH, BESSEMER AND SIEMENS-MARTIN BARS AND RODS OF UNEXCELLED QUALITY.

## SWEDISH PIC IRON.

ALSO,

Steel and Iron Rails, Old Rails, Scrap Iron, Scrap Steel.

### BRITTON IRON AND STEEL CO.,

MANUFACTURERS OF

## BOILER, TANK AND BRIDGE PLATES,

Galvanized and Black Sheet Iron.

Foot of Wason Street, CLEVELAND, OHIO.

## JACKSON IRON COMPANY,

Manufacturers of Fayette Pig Iron (L. S. Charcoal), Stewart Pig Iron (Brimstone Coal and Coke), Also, Hammered Blooms, Billets and Muck Bar, extra low in phosphorus, for Siemens Martin and Crucible Steel. Miners of Jackson (Lake Superior) Iron Ores. FAYETTE BROWN, Gen. Agent. HARVEY H. BROWN, Asst. Gen. Agent. Offices, 130 Water St.

## HARVEY H. BROWN & CO.,

AGENTS

CHAMPION IRON CO., LAKE SUPERIOR IRON CO. } Lake Superior Iron Ores.  
Dealers in Pig Iron, Iron Ores and Old Rails.

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## CHROME STEEL

For Sale by JOHN W. QUINCY, 98 William St., N. Y.

Eighty cases of this Best Quality Cast Steel, to close a consignment, in quantities as required, at less than market rates, in Octagon,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $1\frac{1}{2}$ ,  $2\frac{1}{2}$ ,  $3\frac{1}{2}$ ,  $4\frac{1}{2}$ ,  $5\frac{1}{2}$ ,  $6\frac{1}{2}$ ,  $7\frac{1}{2}$ ,  $8\frac{1}{2}$ ,  $9\frac{1}{2}$ ,  $10\frac{1}{2}$ ,  $11\frac{1}{2}$ ,  $12\frac{1}{2}$ ,  $13\frac{1}{2}$ ,  $14\frac{1}{2}$ ,  $15\frac{1}{2}$ ,  $16\frac{1}{2}$ ,  $17\frac{1}{2}$ ,  $18\frac{1}{2}$ ,  $19\frac{1}{2}$ ,  $20\frac{1}{2}$ ,  $21\frac{1}{2}$ ,  $22\frac{1}{2}$ ,  $23\frac{1}{2}$ ,  $24\frac{1}{2}$ ,  $25\frac{1}{2}$ ,  $26\frac{1}{2}$ ,  $27\frac{1}{2}$ ,  $28\frac{1}{2}$ ,  $29\frac{1}{2}$ ,  $30\frac{1}{2}$ ,  $31\frac{1}{2}$ ,  $32\frac{1}{2}$ ,  $33\frac{1}{2}$ ,  $34\frac{1}{2}$ ,  $35\frac{1}{2}$ ,  $36\frac{1}{2}$ ,  $37\frac{1}{2}$ ,  $38\frac{1}{2}$ ,  $39\frac{1}{2}$ ,  $40\frac{1}{2}$ ,  $41\frac{1}{2}$ ,  $42\frac{1}{2}$ ,  $43\frac{1}{2}$ ,  $44\frac{1}{2}$ ,  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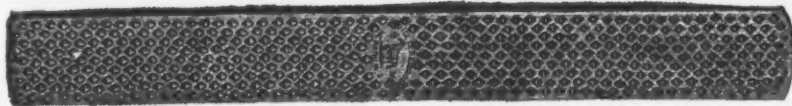
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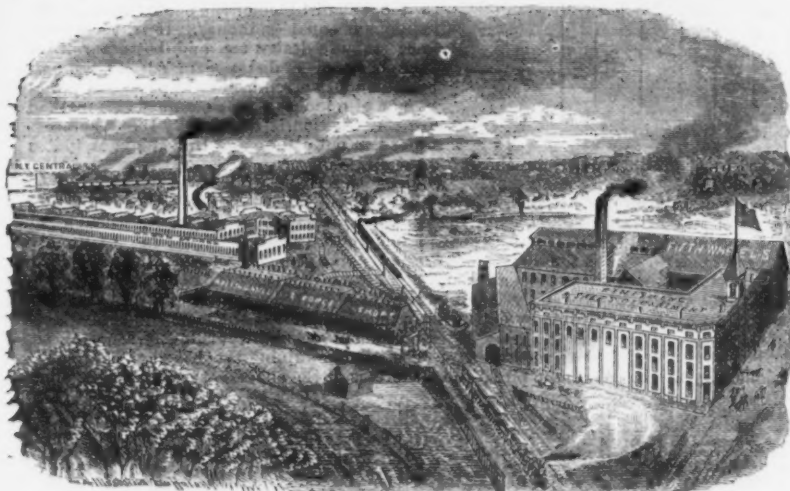


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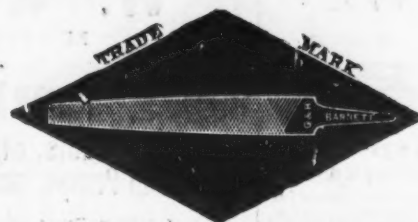
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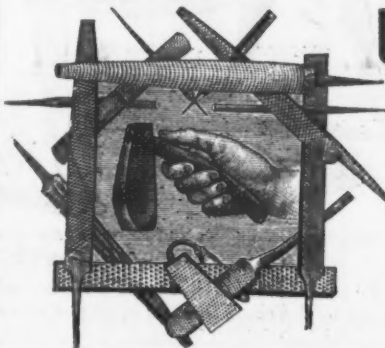
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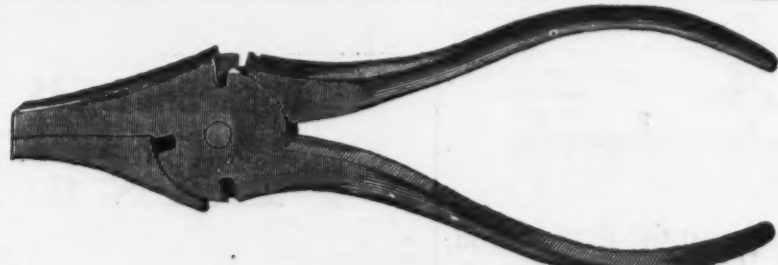
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Cast Steel Shears and Scissors,  
Ketchum's Pat. Metallic Sieves.

W. D. Turner & Co.,  
Geneva Hand Flatteners,  
American Screw Co.,  
Gimlet Pointed Screws, &c.  
Romer & Co., Brass Locks, &c.  
P. Loventrant, Compasses,  
Callipers, Dividers, &c.  
Clark Bros. & Co.,  
Carriage Bolts, &c.  
Loverre & Tucker, the Genu  
ine Knox Plating Machine,  
T. B. Barclay,  
"Dodge's" Kentucky Cow Bells,  
Lane Bros., Swift's and Gro-  
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Faucets, &c.  
T. C. Richards Hardware Co.,  
Bright Wire Goods, Picture Nails,  
&c.

**J. M. KING & CO.,**  
WATERFORD, N. Y.,Manufacturers of the **BUTTONS PATENT****"WIRE CUTTER AND PLIER COMBINED."**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of

Blacksmith and Machinists' Stocks and Dies, Plug and Taper Taps,  
Hand, Nut and Screw Taps, Pipe Taps and Reamers.

Price List on application.

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**SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.**THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice  
crushers, being the only firm in the United States who manufacture all parts of the raw material. The  
mended the Sands' Triple Motion  
White Mountain Freezer to all per-  
sons in the world for the following rea-  
sons: We have used them; they freeze  
quicker than any other; they save time,  
salt and ice; the triple motion makes  
smooth cream without bunches; makes  
more of it; galvanized iron outside; tin  
inside; no zinc in contact with the  
cream; easily adjusted; substantially  
made; simple in construction; perfect  
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and discount of this celebrated Freezer.  
Address,HAND FREEZER.  
2 to 25 qts.  
\$3.50 to \$25.00.HAND OR POWER  
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ICE CRUSHER.  
\$75.00.White Mountain Freezer Co.,  
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SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

**TACKS, NAILS & RIVETS.**Swedes Iron Upholsterers' Gimp, Lace and Card Tacks. Black and Tinned Trunk and Clout Nails.  
Finishing Nails and Brads; Shoe Nails of Swedes and Common Iron; Copper, Brass, Zinc and  
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# A. FIELD & SONS,

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MANUFACTURERS OF

## AMERICAN AND FRENCH WIRE NAILS, TACKS, SHOE NAILS, And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

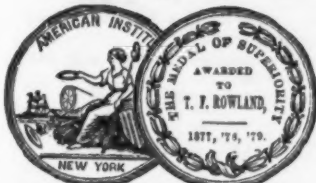
Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

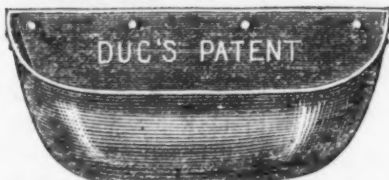
Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

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ALWAYS FIRST  
COMPETITIVE



PREMIUM IN  
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This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 300,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

CAUTION.—The popularity of the DUC'S BUCKET has caused many manufacturers of the old style of Elevator Buckets to closely imitate its spherical shape. We warn all parties against patronizing infringers of our patents, as they will be held accountable. Send for circular. Address

T. F. ROWLAND, Sole Manufacturer, Continental Works, BROOKLYN, N. Y.

The Mill Bucket, in sizes from 3 1/2 to 16 inches.

**OLD COLONY RIVET CO., Kingston, Mass.**  
(Established 1800.)  
Manufacturers of NORWAY IRON RIVETS of Superior quality.

We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Belt, Barrel, Safe and Tank Rivets*, and make promptly to order all sizes not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River. Correspondence with buyers solicited.

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The cutting parts are made to gauge, of choice steel. They can be taken off to be ground, and when worn out can be replaced at a slight expense, making the tool as good as new.

This improvement makes the tool the best and cheapest that you can have in your shop.

All extra cutters warranted to interchange.

The center of rivet being only three-fourths of an inch from the cutting edge, they have nearly double the cutting power of most other kinds.

FLAGLER, FORSYTH & BRADLEY,

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87 Chambers and 69 Reade Streets, New York.

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REVERSIBLE SELF-PACKING AND  
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THE ANSONIA CORRUGATED STOVE PLATFORM,  
With Patented O. C. Border.



Cut Showing Round Platform.

ROUND ZINC.  
27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring  
no nailing or lining, the edge retaining its  
form. Superior pattern, finish and quality.  
Price as low as any.

Send for List and Discount.

Packed 12 in each case.

**PURE ELECTRIC WIRE,**

Manufactured by the

ANSONIA BRASS AND COPPER COMPANY,  
For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Splittorf's patented Liquid Insulation, covered with cotton or silk.  
All sizes of Bare and Covered Wire in Stock.

The conductivity of every bundle tested and warranted.

THE ANSONIA WROUGHT GONGS,  
For Clocks, Indicators, Telephones, Call Bells, Bell Patches, Steamboat and  
Railroad Use. Burnished or Nickel Plated.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

subjected to injurious strains. Thus, in the first groove (1 1/4 inches high) the diameter of the bottom roll is 7 3/4 inches, compared to 9 1/4 for the middle roll—a difference which is by far too great, as usually half an inch is ample. The circumference of the middle roll has, therefore, a much greater speed and the upper surface of the bar is too much stretched. This cannot be remedied, because otherwise the roll becomes too thin in other parts.

A better method for a roughing train

C roll (Fig. 6) may be exchanged if necessary, and in those cases where such an exchange is not provided for, it is only necessary to make the middle roll a full one and make one-half of the rolls A and C like spindles (Fig. 7), a thing which is not possible in other systems. It is in this way that much metal and much labor in turning is saved and the rolls are made easier to handle. Although this improvement is especially applicable to trains running at high speed, it may be used with other kinds also.

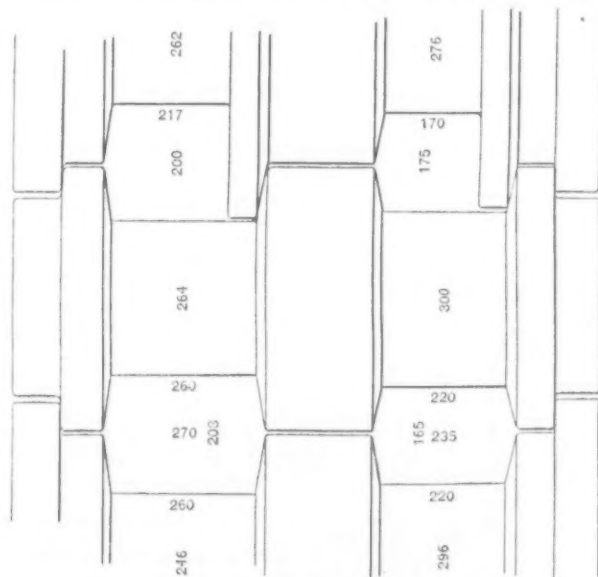


Fig. 5.

with box grooves is shown in Fig. 4, though it also displaces the center lines of the rolls in reference to those of the pinions. It is used upward and downward, without skipping any groove or turning the pile or ingot. In the middle of the middle roll the curve is wider than that of the bottom roll and narrower than that of the top roll, so that fins that are formed are pressed down. As there are no blanks, the whole length of the rolls is utilized. The guards are stationary.

A more recent method, used chiefly when,

The advantages it combines of high speed and of having rolls and pinions in line, have gained for it much favor wherever applied. It was first used at the Lanthierette and at Lawadski, Upper Silesia, Germany, and though the passes do not follow one another in the same row, the men were quick in learning to work it. The bars are not exposed to the danger of being torn, and the quality of the material turned out is better. The half rolls (Fig. 7) may be used to great advantage for all shapes without turning from groove to groove, and channel iron

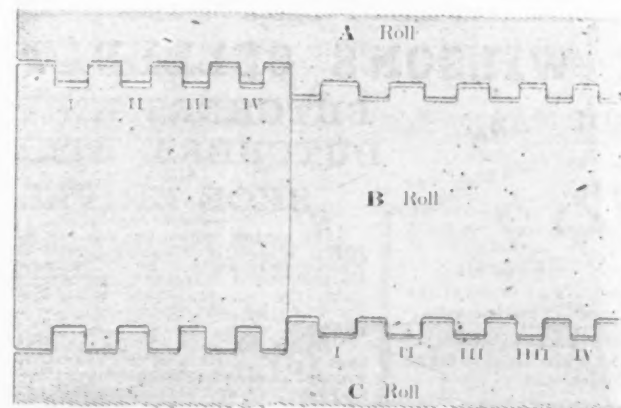


Fig. 6.

as in the case of welding iron piles, the pile must be turned as often as possible during the first passes, and box grooves are wanted for the majority of the different sizes of the pile, is to form the upper grooves by means of the middle roll, and make the latter larger throughout than both top and bottom roll. This brings rolls and pinions into line. The method is now in use for all kinds of finishing trains. There are blank alternate grooves, and in the case that top and bottom rolls are equal, they can be exchanged when worn out, so that the blanks can be

may be rolled in such a way that the fiber is parallel to the shape, so that bolts put through it never strike unwelded spots, as is occasionally the case with material rolled from a pile in the ordinary way.

**New Melting Pots for Glass and Steel.**—An improvement in glass melting pots, the invention of Mr. Enrico Rosenzi, a chemist of Pittsburgh, is being tested at the window-glass factory of McCully & Co., Southside. One of them was used for six and a half weeks, and when removed from

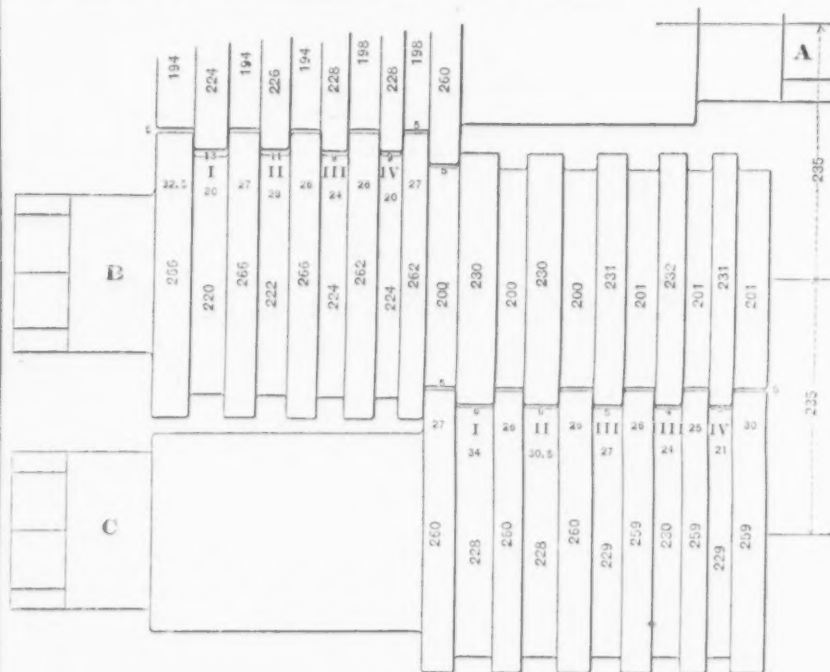


Fig. 7.

used as grooves. The main disadvantage of this system is that it cannot be used for trains running at a higher speed than 150 revolutions per minute, because the hanging guards necessary for the top rolls are dangerous. An example is shown in Fig. 5.

It is for this reason that the hanging guards have been abandoned in a new system to which I desire to call attention, and which was first designed by me in 1876. This is accomplished by dividing the middle roll into two parts by the introduction of an extra collar, and by this means it becomes possible to use the middle roll as the larger one for the bottom roll, and as the smaller one for the top roll. The A and

the furnace showed no sign of deterioration or of breaking, being removed only because the manager thought it had been in long enough for testing, and because he did not care to take any risk. Three others are now in use in the furnaces in the same factory, and are giving entire satisfaction. In appearance these pots differ from those in general use, the surface having the appearance of marble. So far as tested, the flux fails to cut them, while their refractory quality is entirely satisfactory. These pots are to be tested in a flint-glass furnace at the factory of Dithridge & Co., on Washington street. As they stand the window-glass flux so well, it is entirely probable that they will

## Cutlery.

## FRIEDMANN &amp; LAUTERJUNG,

Manufacturers of  
PEN AND POCKET CUTLERY,  
Solid Steel Scissors, Shears, Razors, &c.  
Sole proprietors of the renowned full concave  
"ELECTRIC RAZORS,"  
And the celebrated "ELECTRIC SHEARS." Nickel Plated  
Howa.  
Agents for the BENGALL RAZORS.  
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.  
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

## MERIDEN CUTLERY COMPANY.

The "PATENT" HANDLE TABLE KNIFE.

It is the oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOSE HANDLE  
for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE,  
BUTCHER AND HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application.  
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Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest  
price in wood and iron handles.

## OUR BUTCHERS' and HUNTERS' KNIVES

Are warranted to be equal in style, finish and quality, to any goods made in the world.  
"COMPARE, THEN JUDGE."

We are the sole owners of the Gardner Patent Guard and Rest for Carving Forks, and  
the manufacture of fine carvers is with us a specialty.

AARON BURKINSHAW, Pepperell, Mass.,  
PRUNING, BUDDING AND POCKET KNIVES  
OF EVERY DESCRIPTION.

My Blades are forged by hand from the best cast steel and warranted. Established 1855.

## JOHN WILSON'S CELEBRATED

BUTCHERS' KNIVES,  
BUTCHERS' STEELS,  
AND  
SHOE KNIVES.

It having come to the knowledge of  
JOHN WILSON that Counterfeit Butchers'  
Knives, purporting to be of his manufacture,  
are being sold in the United States, he hereby  
cautions all purchasers of his Knives and  
Steels to be on the alert against such im-  
position.  
JOHN WILSON also hereby gives Notice,  
that it is his determination to institute Legal  
Proceedings against any person or persons who  
may be detected infringing his Trade Mark.  
Every article of JOHN WILSON'S manu-  
facture, bears the Trade Mark, in addition to  
the Name.

WORKS—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.

SEYMOUR'S  
Diamond Edge Solid Cast Steel  
SHEEP SHEARS.

GREAT TRIUMPH OF AMERICAN INDUSTRY.



Every Pair Warranted Superior to Imported. Price lists sent on application.  
HENRY SEYMOUR CUTLERY CO., Holyoke, Mass.

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PHOENIX CASTER CO.,

Indianapolis, Ind.

Kellogg, Johnson & Bliss, Chicago, a re-  
tail house, sold our Casters as follows:  
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They are no experiment. They are as  
safe and good stock as 8d. nails. Their  
value will grow on you if you will introduce  
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## PHOENIX CASTER CO.,

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WROUGHT IRON  
ADJUSTABLE  
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TUCKER & DORSEY,  
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Importer of CHAINS, ANVILS, VISES, &c.  
Agency of  
HILL BROTHERS & CO., WALSALL, ENGLAND  
GENERAL HARDWARE MERCHANTS,  
And of  
BALL'S PAT. SOLID STEEL SHEEP SHEARS.  
These shears are unsurpassed for cheapness, dura-  
bility and utility. They are made of one solid piece  
of steel from point to point, and cannot be broken in  
use either in the bow or at the junction of the shank  
and blade. Samples can be seen at above address, or  
sample lots furnished.

CORPORATE MARK,  
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Joseph Rodgers & Sons'  
(LIMITED)  
CELEBRATED CUTLERY,  
No. 82 Chambers Street, New York.  
F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons'  
productions having considerably increased, they  
have, in order to meet it, greatly extended their  
Manufacturing Premises and Steam power.  
To distinguish Articles of Joseph Rodgers  
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ESTABLISHED 1836.  
Alfred Field & Co.,  
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## Guns and Pocket Cutlery.

SPECIALTIES.  
Headquarters for  
ELEY'S BROS. GOODS, WRIGHT'S ANVILS,  
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STUBS FILES, WESTERN FILES,  
GREAT'S SHEEP SHEARS,  
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GERMAN COIL AND HALTERS and other CHAINS,  
BRADES' TROWELS AND HOES,  
CANASTOTA KNIFE CO.'S POCKET KNIVES,  
Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for im-  
port and export purchased on commission.

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## Kangaroo Sheep Shears.

The best Every  
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made. Guaranteed.

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SOLE AGENTS.  
Send for price list and terms.

## THE SLAYTON RAZOR.



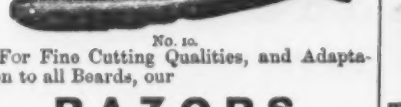
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For Portability.  
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Handles of German Silver, Nickel Plated. Blades of the  
Finest Steel in the World. Every Razor Fully Warranted.  
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For Fine Cutting Qualities, and Adapta-  
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## RAZORS

Have no equal.  
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Barber's Clipper.  
We are sole agents for these Clippers. All or-  
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Horse Clipper.

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Table Knives, Razors, Shovels, &c., &c.,  
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FULL CONCAVE RAZORS A SPECIALTY.  
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Manufactured by COPELAND, HALL & CO.,  
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Fine Mandrel-drawn Tubes, from Brass or Ger-  
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The only Ox Shoe made with  
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Also Flat Shoes with two calks  
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Worth double any Malleable  
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Greenfield Tool Co.,  
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The backstrain when the wrench is used is borne  
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None genuine unless stamped

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FOR  
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IT HAS  
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GUARANTEED  
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Wrought Bar, Head  
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Owing to the in-  
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we are now manu-  
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BUTCHERS' MACHINES,  
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Measuring Tapes  
Of Cotton, Linen & Steel.  
FOR ALL PURPOSES.  
351 to 353 Nassau Ave., Brooklyn, N. Y.

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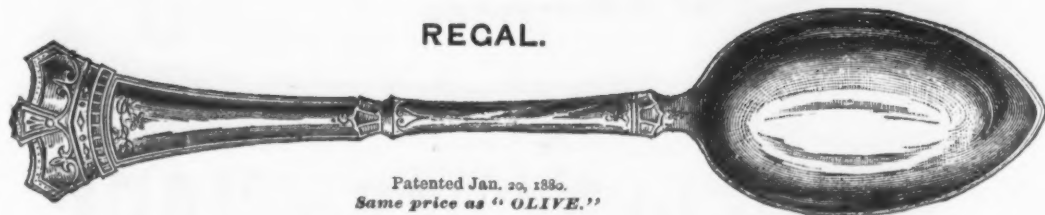
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For Boring Pump Logs and Pump  
Tubing, with all necessary fittings. Agency for  
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## Superior Silver-Plated Table Ware.



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Same price as "OLIVE."

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Same price as "OLIVE."

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Electro Plated Ware, German Silver and Britannia Spoons.



THE "NIAGARA."

Factories, Wallingford Conn.

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HOLMES, BOOTH &amp; HAYDENS,

MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &amp;c.

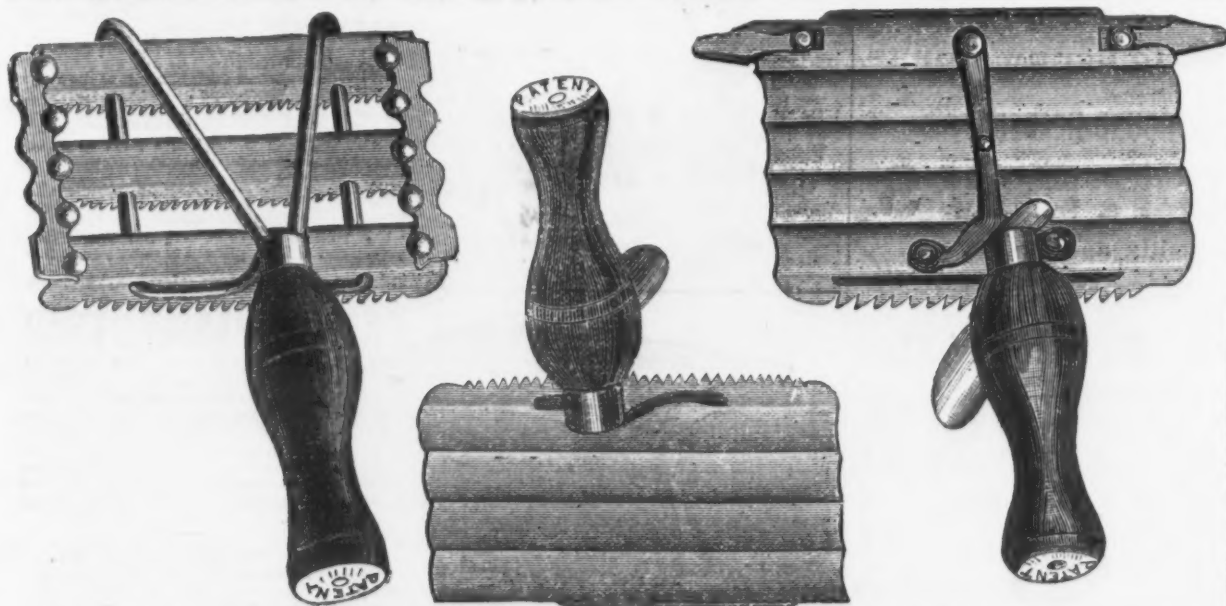


NOTICE.—We guarantee the base of our Spoons, Forks, &amp;c., to be full 12 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

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REVOLVERS, BREECH-LOADING GUNS, TABLE CUTLERY,  
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ATLAS WORKS.J. K. RUPERTUS.  
THE MILLVILLE SHEAR CO.

Our arrangement with Messrs. Graham &amp; Haines as agents for our goods having expired, we shall hereafter have no agencies, but shall sell our own goods direct to the trade. We are confident it will be to your advantage to defer buying any Combs until you have inspected and priced our new lines.

"THE PIONEER,"

which we are manufacturing in connection with the "PERFECT," but which are not subject to the conditions governing the prices of the "PERFECT," and are universally acknowledged to be the best low-priced Combs ever offered to the trade.

Catalogues with Discounts, &amp;c., sent on application.

LAWRENCE CURRY COMB CO.,  
309 EAST 23d STREET, NEW YORK.

give a still better record with the milder batch of the flint-glass house. The same gentleman is experimenting on crucibles for steel melting. If his success with these equals that he appears to have reached with glass pots it will be of great benefit to the steel trade.

## INDUSTRIAL ITEMS.

## MASSACHUSETTS.

The Wasburn & Moen Manufacturing Co.'s works in Worcester are doing a very large business at present. The demand for barb wire is said to have far exceeded the supply, even before the recent legal decision sustaining the company's patents.

## CONNECTICUT.

A meeting of the corporators of The Cape-well Horse Nail Company was held at the office of James L. Howard & Co. on Tuesday, and the company organized under the joint stock laws of Connecticut. The capital of the company is \$200,000, divided into two thousand shares of \$100 each. At a subsequent meeting of the directors the following officers were elected, viz.:—Frank L. Howard, president and treasurer; William H. Post, vice-president; and Albert L. Burke, secretary. The works of the company are to be located in Hartford, and the business will be commenced at once.—Hartford Courant.

## NEW JERSEY.

At the Adams silk and cotton mill in Van Houton st., Paterson, a new 100-horse power boiler has just been put in. When the connections were finished and the wheels of the big globe valve was turned, to admit steam from the old to the new boiler to try it, the globe valve burst into a dozen pieces. John Tracy, the boiler tender, was knocked over, but not seriously hurt. Charles Knoble was burned about the hand and arm. Thomas Wheeler was scalded in the face, and will probably lose one of his eyes. Charles Burchell was scalded about the neck. None of those injured are likely to die.

In imitation of the many boilers that have exploded recently, a cylinder of the drill locomotive "Harry Beebe," on the Delaware, Lackawanna and Western Railroad, burst in Newark a few days ago. The locomotive was running near Sheffield street when the explosion occurred. The report was like that of a large cannon. A fragment of iron was sent crashing through the window of an unoccupied house near the railroad. No one was injured.

## PENNSYLVANIA.

The Pottstown Iron Company, of Pottstown, manufacturers of pig iron, boiler, tank and ship plates, are full of business, and employing two forces of workmen, and are running day and night in all their departments. Their pig iron is made from their own ore, and their boiler, tank and ship plates have a wide reputation for their superior quality and finish, they being made on three-high chilled rolls. Their works are very extensive, comprising two blast furnaces, nail works and plate-iron works. They employ 1000 hands in all their departments. The nail factory has a capacity of 250,000 kegs per annum. In the other departments they make 13,000 tons plate iron, 30,000 tons pig iron and 28,000 tons of puddle bars, and have five rolling mills, and a cooper's shop, for the manufacture of nail kegs, connected with their works. During the panic they were kept in steady operation, and the employees were promptly paid their wages every pay day. The idea of running a nail factory by night was a new feature of the business, but by the aid of the electric light, which was first tried in the nail department as an experiment, and which proved a success, its practicability has been demonstrated, and the electric light has since been furnished throughout their entire works. They have lately fitted up a building for office purposes, which is connected by telephone with all the different departments of their works.—Commercial Bulletin.

The board of directors of the Thomas Iron Company met on Thursday, at their office in Easton, and decided to declare a dividend of 4 per cent. from the earnings of the last six months.

The Isabella Furnace, which stood idle for a number of years past, but which was recently put in operation, is now in full blast and turning out about four tons of iron per day of a splendid quality. The iron is used in the manufacture of car wheels, for which it is in great demand. Owing to the heavy fall of snow the proprietors were unable to get in their full supply of charcoal, and some tears are entertained that they may run out of fuel before a supply can be obtained.—Reading Eagle.

The blast furnace of the Pottstown Iron Company is undergoing repairs.

A. K. Lorah, of West Chester, and David Williams, of North Coventry, Chester County, have leased a tract of land in Pottsgrove township for the purpose of working a vein of copper.

The Philadelphia Shafting Works, Geo. V. Cresson, proprietor, have all the business they can attend to.

## PITTSBURGH AND VICINITY.

It is rumored that the Pittsburgh Steel Casting Company intend erecting a 5-ton Bessemer plant.

Oliver Bros. & Phillips report that there has been a decided improvement in business since last week. They are running full in all departments, with plenty of orders.

Mackintosh, Hemphill & Co., Limited, are erecting an open-hearth steel plant for making steel castings by the Terrenoire process.

Williams, Long & McDowell are running their bar and guide mills, while their plate mills are idle. They are moderately full of orders, and anticipate an active demand in the near future. They have just placed a new set of muck rolls, made by Robinson, Rea & Co., in position, and find that these are working very nicely.

Just now the Etna Iron Works Co. at Etna, are engaged at boring two new gas wells near Saxenburg, about 13 miles from the works, whence a supply of gas has been received for about 5 years. The company find their supply of gas to be inadequate for the late additions to the works,

which are operated in every department. This company has made great experiments in boring for gas. Their first attempt was a well 2500 feet deep at the works, but a salt water vein was struck, which yields about 8000 barrels water every 24 hours. The second attempt at the above-named place gave them abundant gas.—Commercial Gazette.

The manufactories along the Monongahela River were obliged to shut down Saturday, on account of the high water.

H. K. Porter & Co., locomotive builders, are running full just now on domestic work. They have just shipped a 15-ton locomotive for the Washington and Waynesburg Railroad, and have an order on hand for several engines for a Texas railroad. A new locomotive has just been completed for the Soho Furnaces, and one is now being made for the Lucy Furnace, which will be the third locomotive made for that furnace. They also have orders booked from parties in Philadelphia, South Carolina, Alabama, New York, Michigan, Mississippi, Texas and Kentucky.

It is rumored that a part interest in the Lucy Furnaces has been sold to Wilson, Walker & Co.

At the Crescent Tube Works the night turn has been taken off for two weeks, in order to facilitate taking stock.

Totten & Co., founders, have all the work on hand that they can attend to. There is quite an active demand at present for their crusher and pulverizer.

A. A. Hutchinson & Bro. have sold 145 coke ovens and some property at Bradford to H. C. Frick & Co. for \$225,000.

At the meeting of the Western Flint and Lime Glass Protective Association, held on Monday, the old officers were re-elected, viz.: President, John Adams; vice-president, Wm. C. King; secretary, Paul Zimmerman; treasurer, D. C. Ripley; additional managers, A. H. Heisey and Wm. Doyle. Actuary Joseph G. Walters was re-elected. The association was never in a more prosperous condition.

It is reported that the Edgar Thomson Steel Company intend increasing their blast furnace plant by the erection of two 20 foot stacks.

The Elba Iron and Bolt Works are running full of orders and have as much on hand as they can attend to. The prospects are good, and although they do not anticipate a marked advance in prices, still they believe that there will be a general stiffening up. Just now the demand for nuts and bolts, which enter largely into railway equipment, is very strong.

## VIRGINIA.

Col. Robert Sayers, of Wytheville, will begin the erection of an iron furnace in Rye Valley at an early date.

## WEST VIRGINIA.

The Beale Rolling Mill, at Parkersburg, which has been idle for some time, has been put in operation again.

The Riverside Iron Works are on in all the departments, except the forge at the upper mill, which is running only half time. Coal is being brought from other localities in large quantities, and this mill will continue to run on purchased coal until other arrangements are made.

## OHIO.

The Cincinnati Tool Company, manufacturers of hardware specialties at Nos. 216, 218 and 220 West Second street, Cincinnati, issued their first catalogue and price list on the 1st of January, 1880. It is a neat little work, containing about 40 pages, in black and gold covers, with handsome illustrations of leading specialties on front and back. The company have three large floors, amply supplied with machinery. Among the specialties of this establishment we may mention an entirely new tool, known as an adjustable wrench, possessing great utility and convenience in adjustment; a bench stop of new design, combining novelty and simplicity with great utility; a spoke pointer, possessing much merit in the peculiar construction of its knives, so as in its motion to make a paring cut; an adjustable hollow auger for cutting round tenons; a saw vise, made in several sizes, being a simple and effective device for holding saws for the operation of filing. Besides these, the company make quite a list of excellent tools, all of which possess some new and novel features.

The Joel Hayden Brass Company's buildings at Lorain are nearing completion. Workmen are busily engaged putting on the roof. It is expected that about 300 workmen will be set to work by the 1st of April next, which will necessarily increase the population of Lorain very much, as a majority of the workmen will have to be imported. With the brass works, Jay Gould's proposed new road along the lake shore, and a good prospect of a new road from the coal fields, the town will get such a "boom" as it has never known before.—Cleveland Herald.

The blast was put on at the Alice stack last Thursday night, after a silence of a couple of months. Saturday the first iron was made. The furnace is running well, making about 40 tons of mill just now.

Sarah Furnace will bank up to-day for a couple of weeks' repairing. She has been running steadily for 20 months.

The iron work of the new Court House, Columbus, has been awarded to H. B. Clough & Co., Middletown, at \$30,000.

The Brown & Bonnel Co., Youngstown, are about negotiating for a site to erect two blast furnaces.—Labor Tribune.

All hands are busy upon the repairs and changes being made at the Belfont Furnace, Ironton, preparatory to putting it in blast.

The Universal Machine Works, Cincinnati, are building a band saw for foot power, with 31-inch wheel, to run 400 revolutions per minute. It will be one of the most powerful machines of the kind that was ever known, and will soon be ready for the trade.

The boiler house of the Valley Rolling Mill, of Youngstown, was entirely destroyed by fire on the 15th inst. Loss, about \$6000; insurance, \$3000. The mill will resume in one week.

## ILLINOIS.

Nicol & Bun, founders and machinists, of Peoria, have recently very much improved their works by putting in some new ma-

# H. D. SMITH & CO.,

## Plantville, Conn.,

Manufacturers of the

## BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

## SARANAC HORSE NAIL CO.

### Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

PLATTSBURG, N. Y.

W. S. GUIBORD, Secretary.

ELY & WILLIAMS, Gen'l Agents for Eastern and Middle States, 1232 Market St., Philadelphia; 178½ Water St., New York; 36 Oliver Street, Boston. S. H. & E. Y. MOORE, Gen'l Agents for Western States, 163 and 165 Lake Street, Chicago, Ill.

SAM'L G. B. COOK & CO., Agents for Southern States, Nos. 67 and 69 (old Nos. 5 and 7) German Street, Baltimore, Md.

SARANAC HORSE NAILS,

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Terms, Cash, within 60 Days.

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BREECH LOADING GUNS.



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BREECH LOADING GUNS.

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AMERICAN BREECH LOADING  
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## GUNS

CHEAPEST AND BEST GRADES.  
ENGLISH MUZZLE LOADING  
BELGIAN " "  
FLOBERT RIFLES, Plain and Remington System.

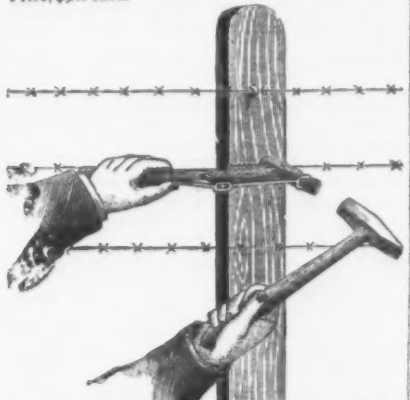
BRITISH BULL DOG REVOLVERS, 38, 44 and 45 Calibre.

Agents for COLT'S and ROBIN HOOD line of REVOLVERS, BRIDGEPORT GUN IMPLEMENT CO.'S GOODS, UNION METALLIC CARTRIDGE CO.

THE PATENT SELF-FEEDING STAPLE SET-  
TER FOR WIRE FENCES.



Holds 50 Staples, saves one man's work, saves torn hands and mangled fingers, enables barbed fence to be put up in the coldest weather and with thick gloves, and is warranted of the best steel and malleable iron. Price, \$3.00 each.



For Illustrated Catalogue of our own patented specialties, address Phila. Novelty Manufg. Co., 301 Cherry St., Philadelphia, Pa. Export Agents, Fairbanks & Co., 311 Broadway, N. Y.

## T. NEW'S REPAIRED ROOFING

For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free.

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No. 1 Platt Street, New York,

PROPRIETOR OF THE ATLANTIC SCREW WORKS,  
MANUFACTURER OF

IRON AND BRASS FLAT AND ROUND-HEADED

## WOOD SCREWS,

Of all kinds, of Superior Quality and Finish.

AGENT FOR

THE FLORENCE TACK CO.'S

## TACKS, BRADS AND FINE NAILS,

Of every description, for home and export trade, and

C. A. MAYNARD'S

C. S. HOES, PLANTERS', HILLING, BOG AND FIELD SHOVELS,  
SPADES AND SCOOPS AND BRICK TROWELS,

OF ALL PATTERNS.

Offers from stock an assortment of

Nettlefolds' Screw Eyes, Hooks, &c., and Rivets, Jack

Chain, single and double; Thrall's Rules;

Burden's Horse and Mule Shoes;

Ausable, Canton and Vermont Horse Nails.

## BAEDER, ADAMSON & CO.

Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.

(Also in Rolls, for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-  
ing for Covering Boilers, Pipes, &c., Cow Hide Whips.  
Stores: PHILADELPHIA, 730 Market St.; BOSTON, 143 Milk St.  
NEW YORK, 67 Beekman St. CHICAGO, 182 Lake St.



## THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.



## THE 'RAPID TRANSIT' TRAP

Has no superior, and is a sure and certain catcher of Mice. With the Metal Platform resting on wood bottom of Trap, an invitation is always extended to Mice of whatever "kind, color or condition of race," into secure and grated quarters, from which they are released by opening cover of Trap and depositing contents into a pail of water.

The Mice go in at a rapid rate, And each one sets it for his mate.

Patented August 27, 1878.

Manufactured by

THE SMITH & EGGE MANUFACTURING CO., Bridgeport, Conn.

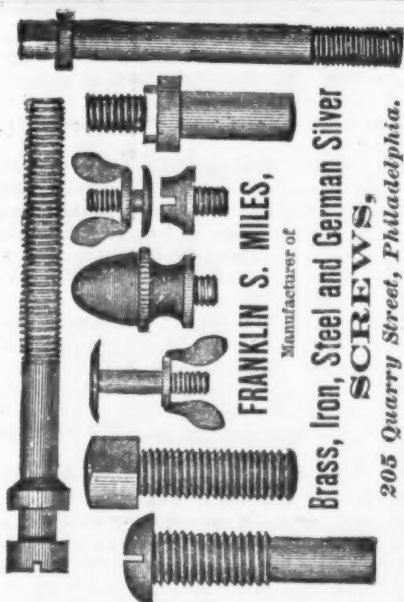
## Delusion Rat and Mouse Trap,

Manufactured by

CLAUDIUS JONES & CO.,  
ERIE, Penna.

This is the only Self-acting Trap on the market, and the most successful.

All orders direct to  
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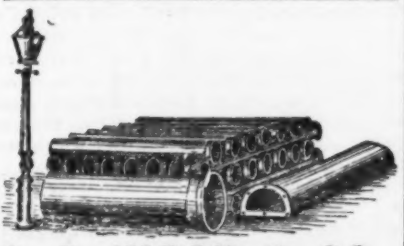


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94 Chambers St., New York, Agents for  
American Screw Co.'s Wood Machine and  
Rail Screws, Stove and Tire Bolts, Rivets, &c.  
G. F. Warner & Co.'s Carriage Clamps.

### DEPOT FOR

O. Ames & Son's Shovels, Spades and Scoops.  
A. Field & Son's Tacks, Brads, Nails, &c.  
Nicholson File Co.'s Files and Rasps.  
W. & S. Butcher's Chisels, Gouges, Plane  
Irons and Cleavers.  
E. W. Gilmore & Co.'s Strap and T Hinges.  
Russell Jennings' Auger and Dowel Bits.  
Also a general assortment of Hardware.



## R. D. WOOD & CO.

Philadelphia,  
Manufacturers of

## Cast Iron Pipe

FOR WATER AND GAS.  
Lamp Posts, Valves, &c.,  
Mathew's Pat. Anti-Freezing Hydrants  
400 CHESTNUT STREET.

## N. Y. MALLET and HANDLE WORKS



Manufacturers of  
Calipers, Carpenters', Stone Cutters',  
Tin, Copper and Boiler Makers'.

### MALLETS,

Hawking Beeties, Hawking and Calking Irons:  
also all kinds of Handles, Sledge, Chisel and Hammer  
Handles. Also

COTTON AND BALE HOOKS,  
Patented Feb. 13, 1877; a new combination of Hooks,  
458 E. Houston St., New York City.

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STANDARD  
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RELIABLE

## STEEL PENS

FOR SALE  
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ESTERBROOK STEEL PEN CO.  
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E. PHILLIPS & SONS,  
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## W. & J. TIEBOUT,

Manufacturers of  
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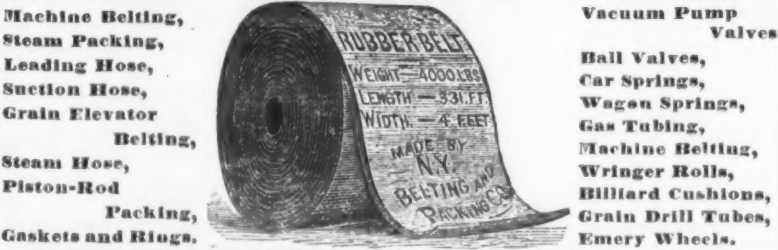
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Manufacturer of



Hardware Novelties, Glass Cutters, &c.

## Vulcanized Rubber Fabrics

ADAPTED TO  
MECHANICAL PURPOSES.  
RUBBER BELTING and PACKING.

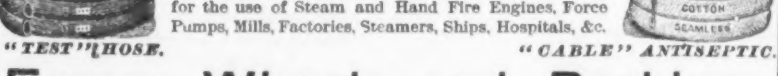


Machine Belting,  
Steam Packing,  
Leading Hose,  
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Belting,  
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This company manufactures the immense DRIVING and ELEVATOR BELTS for the Buckingham  
Elevators at Chicago, which have been running perfectly for more than twelve years, also those for  
Armour, Dole & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R.  
R. N. Y. being the Largest Belts in the World! We are now making an Elevator Belt, 35  
inches wide and 200 feet in length, which will weigh over 15,000 pounds.

## LINEN and COTTON HOSE,

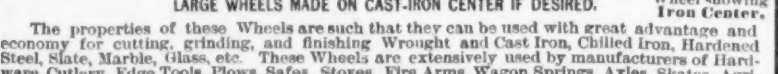
Pat. 6545. Plain and Rubber Lined. Pat. 1873.  
Circular Woven-Seamless Antiseptic RUBBER  
LINED "CABLE" HOSE and "TEST"  
HOSE, Vulcanized Para Rubber and Carbolized Duck,  
for the use of Steam and Hand Fire Engines, Force  
Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.



## Emery Wheels and Packing.

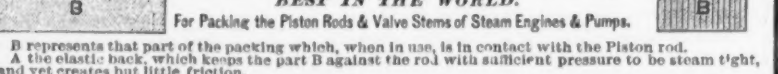
Patented. ORIGINAL  
Solid Vulcanite  
EMERY WHEELS

LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.  
The properties of these Wheels are such that they can be used with great advantage and  
economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened  
Steel, Slate, Marble, Glass, etc. These Wheels are extensively used by manufacturers of Har-  
ware, Cutlery, Edge Tools, Plows, Saws, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agri-  
cultural Implements, and small Machinery of almost every description.



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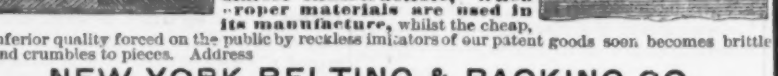
Rubber Back Square Packing  
BEST IN THE WORLD.  
For Packing the Piston Rods and Valve Stems of Steam Engines & Pumps.



B represents that part of the packing which, when in use, is in contact with the Piston rod.  
A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight,  
and yet creates but little friction.

## Corrugated Rubber Mats and Matting,

Pat. 11,288, 213,701. For Halls, Flooring, Stone and  
Iron Stairways, &c. Pat. July, 1879.



inferior quality forced on the public by reckless imitations of our patent goods soon becomes brittle  
and crumbles to pieces. Address  
NEW YORK BELTING & PACKING CO.,  
Warehouse, 37 and 38 Park Row, New York.  
JOHN H. CHEEVER, Treasurer.

## TACKS & NAILS.

CUT TACKS, SHOE NAILS, WIRE NAILS,  
Pat. Brads, Finishing Nails, Clout Nails, Trunk Nails, Hungarian Nails,  
Cigar-Box Nails, Basket Nails, 2d and 3d Fine Nails,  
Carpet Tacks, Upholsterers' Tacks, Gimp and Lace Tacks, Brush  
Tacks, Copper and Brass Tacks,  
BRASS AND IRON ESCUTCHEON PINS, &c., &c.

MANUFACTURED BY  
DUNBAR, HOBART & WHIDDEN, So. Abington Station, Mass.  
New York Salesroom, 39 Warren St. Goods made to order from sample.  
Particular attention given to orders for EXPORT.



## HOLROYD & CO., Waterford, N. Y.,

Manufacturers of  
STOCKS AND DIES,  
For Blacksmiths, Machinists and Gas Fitters.  
Send for Circular.



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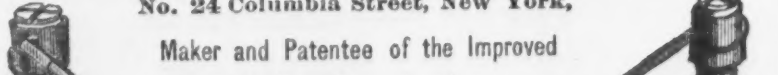
No. 24 Columbia Street, New York,  
Maker and Patentee of the Improved  
Hydraulic Jacks  
AND  
Punches.



Roller Tube Expanders and Direct Acting Steam Hammers.  
Communications by letter will receive prompt attention  
Jacks for pressing on Car Wheels or Crank Pins made to order.



Beardsley Scythe Co.,  
Manufacturers of  
GRASS, GRAIN & BUSH SCYTHES,  
Hay Knives & Corn Knives,  
West Winsted, Conn.



See our advertisement in The Iron Age first issue of each month.

chinery, which has much increased their ca-

capacity.  
The Illinois Iron and Bolt Co., of Carpen-  
terville, are again running on full time. The  
"shut down," as reported, was only for one  
day. Ice has been cut away at the mouth  
of the race and water is again plenty.

Frederick Schroeder is negotiating with  
Elgin parties for the opening of an exten-  
sive plow factory in that city. He is the  
patentee of a new combination plow that  
serves the treble purpose of an ordinary  
plow, a marker and a planter. It can be  
used advantageously, it is claimed, for plant-  
ing both corn and potatoes. Mr. Schroeder  
is desirous of opening his factory late in the  
spring. He says he will employ from 75 to  
100 hands.—Chicago Industrial World.

The Lyman Manufacturing Co., of Grand  
Crossing, begin work on Thursday morning,  
commencing in the barb-wire difficulty hav-  
ing been effected.

The Hercules Iron Works are still hard  
pushed to turn out the large contracts on  
hand.

It seems now to be pretty well settled  
that locomotive works will be established at  
Pullman, as we reported in these columns  
some time ago. A wealthy corporation  
formed at Providence, R. I., for the manu-  
facture of locomotives, has purchased thirty  
acres of land between Irondale and Pull-  
man. The business in the East has increased  
so that the shops are all behind their orders.  
This will be the only establishment of the  
kind in the West. The situation of Pullman  
and the other large manufacturing have at-  
tracted attention to this part of the country.  
The company is composed entirely of eastern  
capitalists.—Chicago Industrial World.

MICHIGAN.

At the Baugh Steam Forge in Detroit, the  
bar mill is on double with both furnaces, the  
guide mill single, and all other departments  
full, making iron for the Michigan Car Com-  
pany solely.

The Union Iron and Steel Company, of  
Chicago, has purchased a lease on the  
Negaunee hematite range, adjoining the  
Baraga, and are also negotiating for other  
property in the district.

The furnace at Menominee has been re-  
christened, in honor of the town in which it  
is located. It will be known hereafter, as  
originally, as the Menominee Furnace.

Pioneer stack No. 2 was blown out last  
Saturday, after a continuous run of nearly 13  
months on one hearth, during which time  
she made 14,672 tons of pig metal. She  
will be blown in again as soon as supplied  
with a new hearth.

The Spurr mine is advertised to be sold at  
chancery sale, at L'Anse, March 2. In the  
few years that the Spurr was wrought, un-  
der anything but efficient management, it  
yielded very nearly 150,000 tons of ore. We  
believe it to be a property worthy the  
attention of capitalists.—Marquette Mining  
Journal.

MISSOURI.

The rebuilding of the Broadway Foundry,  
St. Louis, has not yet been commenced,  
the insurance not having been adjusted.

The Atlantic Milling Co., of St. Louis,  
have had a new Harris-Corlis engine built  
for them at Providence, R. I., and are now  
placing it in position.

The St. Louis Iron and Machine Works  
are engaged in replacing the machinery  
recently broken at the Laclede Rolling Mills.  
One of the cog-wheels, successfully cast a  
few days ago, weighs 15 tons.

The Fulton Iron Works are engaged in  
manufacturing a lot of machinery for the  
St. Louis elevator.

KENTUCKY.

The Louisville Steam Forge Company, on  
the erection of their new buildings in that  
city, will make a specialty of railroad car  
wheels, but will manufacture all kinds of  
large forgings.

Ashland Furnace continues doing well,  
making 50 tons per day on all raw Coalton  
coal for fuel.

The bed plate of the big engine at the  
Norton Iron Works broke last week, caus-  
ing a stoppage of the whole works until  
probably the end of next week.

Hunnell Furnace produced during the  
year just closed 5431 tons of mostly foundry  
pig metal, running 320 days in all,  
which is equal to a daily average of 17 tons,  
and using per ton of iron made, 134 bushels  
of charcoal, 2 96-100 tons of iron ore, and  
one-fifth of a ton of limestone. Her stock  
receipts during the year foot up as follows:  
17,084 tons of iron ore, 1036 tons of lime-  
stone, 3603 1/2 loads of charcoal, 22,800  
cords of wood.

GEORGIA.

The old Schofield rolling mill at Atlanta  
has been merged into the Georgia Iron  
Works.

The cold-blast charcoal furnace at Ridge  
Valley, Floyd County, near Rome, has lately  
gone into blast, the first iron being shipped  
on the 8th instant—from 12 to 15 tons per  
day is the capacity. The stack is 43 x 10,  
and was built in 1873-4.

The Rising Fawn Furnace was blown in  
some days ago, and is now in full operation.

The Oakdale Iron Company are running  
their furnaces in Roane County steadily,  
making 50 tons of iron a day. The fuel used  
is one-half coke and one-half raw coal, mined  
on the property.

TENNESSEE.

On Wednesday last the Vulcan Iron and  
Nail Works, of this city, were transferred to  
a company represented by Gen. Powell,  
of Belleville, Ill., who have commenced mak-  
ing such repairs as will enable them to  
operate the nail mill at an early day, prob-  
ably by the first of February. This will  
give employment to about 350 hands. At  
the present writing it is not determined to  
what extent the works will be operated,  
but it is thought no iron will be made for  
the present. When the entire works are  
put in operation, between 500 and 600 hands  
will be employed.—Chattanooga Tradesman.

Dr. Siemens, who appears to be indefatigable  
in seeking to extend the sphere of  
usefulness of electricity, has brought out an  
electric elevator, which he has been exhib-  
iting at Mannheim, Germany. Its con-  
struction appears to be simple, and suggests  
an easy method of putting in safety  
brakes. The cage is carried by wire  
ropes, having counter-weights, so that the

cage, when loaded, is practically in equi-  
librium. The current generator at the  
base is electrically connected to the dynamo-  
machine in the cage, and the latter actuates  
two toothed wheels, taking into a metal rack  
running up the center of the passageway of  
the lift.

The Outlook for International Tele-  
graph Communication.

The consolidation under one organization  
of the Western Union, the Atlantic and  
Pacific and the American Union Telegraph  
companies, while it must necessarily lead to  
an improvement in the general telegraph  
service of the country, together with a re-  
duction in the cost of telegraphy through  
the concentration under one system of the  
forces now employed in keeping up three  
systems, is but preliminary, as it appears, to  
the rapid and systematic development,  
under the general management of General  
Eckert, of a grand telegraphic network ex-  
tending around the world, and having its  
center not at London, but at New York.

For some time past Mr. Cyrus W. Field  
has been agitating the project of establish-  
ing such a telegraphic network. But while  
Mr. Field has been talking about it the En-  
glish "leviathan of cables," Mr. Pender, has  
been adding wire to wire and rope to rope to  
form his world-girdle of "international  
telegraphy," the basis of which was to be  
the complete subordination of the whole  
cable service of the world to the cable con-  
solidation effected by Mr. Pender in Lon-  
don. On the 14th of December last the  
London correspondent of the World an-  
nounced that the first practical step toward  
breaking the continuity of Mr. Pender's  
grand cosmopolitan coil had been taken by  
the American Union Telegraph Company,  
in behalf of which Mr. Jay Gould had  
ordered from the well-known cable con-  
structors, Messrs. Siemens & Company,  
two new cables of the first class, to be laid  
at the earliest possible moment from the  
coast of England to the coast  
of Newfoundland. This announcement  
excited great consternation in the "cable  
world" of Great Britain, and led to an im-  
mediate correspondence between Mr. Pender  
and Mr. Gould, the principal points of which  
were cabled to the World by its London  
correspondent, and which ended with a  
plain, but polite, intimation to Mr. Pender  
that the United States had declared its inde-  
pendence in matters telegraphic. The next  
step has now been taken in the consolidation  
into one organization, under Gen. Eckert,  
whom President Lincoln long ago pro-  
nounced the prince of telegraphers, of all  
the American land telegraph companies  
which own or control cable connections  
with other countries, and in the filing at  
Albany on Wednesday, the 19th inst., of the  
certificate of association of the American  
Telegraph and Cable Company, duly organ-  
ized under the statutes of New York of 1843  
affecting telegraph companies and the acts  
amendatory thereof. This company is or-  
ganized for the purpose of "owning, con-  
structing, purchasing, leasing or otherwise  
acquiring, using, operating and maintaining  
a land and submarine line or lines of electric  
telegraph, partly within and partly without  
the limits of the State of New York." The  
capital stock of the company will be \$20,-  
000,000, with power to increase the same  
to such amount as may be necessary to build  
and construct the lines of telegraph and  
cable contemplated by the company, and the  
term of the association is fixed for 50 years  
from the 18th of January, 1881, to the 16th  
of January, 1930, and its headquarters are  
to be in the city of New York.

Under the consolidation of the three tele-  
graph companies, the American Telegraph  
and Cable Company, co-operating with the  
new organization, will at once proceed not  
only to increase the existing cable facilities  
between this country and Europe and to ex-  
tend southward the cables which now con-  
nect this country with Cuba and the West  
Indies, so as to secure for the great coffee  
trade of the United States a direct tele-  
graphic communication with Brazil, but also  
to lay cables under the Pacific from San  
Francisco to Honolulu. From Honolulu one  
cable will be laid under the North Pacific to  
Japan, connecting there with the cable  
from Itok to Shanghai, in China, and  
another under the South Pacific, by way of  
Ellice's Islands and the Friendly Isles, to  
New Caledonia, and thence to Brisbane in  
Australia, where it will connect with the  
Australian and New Zealand cable system in  
one direction, and with the Australian and  
Straits system in the other direction. It is  
not the intention of the company to adopt  
the idea favored by Mr. Field and Mr.  
Everts, of asking for a government guaran-  
tee on these Pacific lines, as it is well ascer-  
tained that if these cables are constructed  
on sound principles and managed with  
judgment and economy, they cannot fail to  
be remunerative. Should the government  
desire it, however, a connection may be  
made from Vancouver's Island, by way of  
Alaska, with Petropaulowski and thence with  
the North of Japan, and for such a connec-  
tion it would seem to be proper and fair that  
the governments of Russia and Japan, as  
well as of the United States, should assume  
a reasonable pecuniary responsibility, since,  
excepting in connection with the whaling  
interest, which now suffers greatly from the  
remoteness and inaccessibility of the seas in  
which it is so largely prosecuted, no very  
profitable business is likely to be developed  
on that part of this world-wide cable system  
for some years to come.

Under the new arrangements, our tele-  
graphic and cable communications with the  
West Coast of Mexico, with Central America  
and with South America, can and will be  
pushed forward with great rapidity.

Under the auspices of a German society,  
the Verein zur Beforderung des Geweroll,  
Prof. Wedding, of Berlin, is conducting a  
series of important experiments on the weld-  
ing properties of Bessemer and open-hearth  
steel; 115 samples have been submitted by  
German works, and have been welded at the  
Borsig Works at Moabit, Berlin, according  
to directions. Mechanical tests and chemi-  
cal analyses are to be made, and it is ex-  
pected that important facts will be discov-  
ered on the circumstances influencing the weld-  
ing properties of steel.

# The Iron Age

## Metallurgical Review.

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CONTENTS.

First Page.—Andrew Kloman. Scientific and Technical. The Production of American Steel Works in 1880.

Third Page.—Wentworth's Improved Saw Vise. Adjustable Dado, Fillet, Plow, &c. The Hardware Trade of Chicago in 1880.

Fifth Page.—Scientific Terminology.

Seventh Page.—Improvements in Three-High Rolls.

Ninth Page.—Improvements in Three-High Rolls (Continued). New Melting Pots for Glass and Steel.

Eleventh Page.—Industrial Items.

Thirteenth Page.—Industrial Items (Continued). The Outlook for International Telegraph Communication.

Fourteenth Page.—The English Board of Trade Returns for 1880. Underground Telegraph Wires. Our Trade with Greece. An English National Free Trade Union.

Fifteenth Page.—The Egyptian Obelisk. Washington Notes. New Publications. English Blast Furnaces.

Sixteenth Page.—Polytechnic Club of the American Institute.

Twentieth Page.—The Matanzas Exhibition. Turned Through the Palisades.

Twenty-first Page.—Trade Report. General Hardware.

Twenty-second Page.—General Hardware (Continued). British Iron Market. Iron. Metals. Coal. Old Metals. Paper Stocks, &c. Exports. Imports. Philadelphia.

Twenty-third Page.—Philadelphia (Continued). Pittsburgh. Chicago. Chattanooga. Cleveland. Boston. Louisville. St. Louis.

Twenty-fourth Page.—Richmond. Baltimore. Cincinnati. Our English Letter Foreign. The East River Suspension Bridge.

Twenty-fifth Page.—The East River Suspension Bridge (Continued).

Twenty-sixth Page.—The Iron Age Directory.

Thirtieth Page.—New York Wholesale Prices.

Thirty-first Page.—New York Wholesale Prices (Continued).

Thirty-second Page.—New York Wholesale Prices (Continued).

Thirty-third Page.—Philadelphia and Pittsburgh Hardware and Metal Prices.

Thirty-fourth Page.—Boston Hardware and Metal Prices.

The Western Railroad Association seems to be doing a good work in averting unnecessary and costly litigation, brought by inventors to enforce their real or supposed claims against railroads for the infringement of patents. Care is taken by purchasing agents to avoid infringing patents which the railroads are not prepared to recognize, by purchasing, in case of doubt, only from manufacturers who can give assurance of the right to use the patents in question, or who will agree to assume liability for the consequences of infringement. When claims are made by the owners of patents said to be infringed, the claims are investigated, and in many cases settlements have been reached much more quickly, cheaply and to the satisfaction of all parties than would

have been possible had the dispute been carried to the courts. Where agreements could not be reached without recourse to the courts, test cases have been made, which, without burdensome expense to either party, have settled all the questions at issue between them. There are many advantages in such co operation for mutual protection, and the only danger is that it may ultimately lead to a disinclination to recognize the rights of any inventors who cannot enforce their claims against a strong alliance.

### The English Board of Trade Returns for 1880.

The Board of Trade returns for the year 1880 are of more than ordinary interest, as they clearly show the improvement in the trade of Great Britain during that period, compared with the year immediately preceding it. The imports were £409,990,056, against £362,127,741 in 1879, an improvement of nearly 14 per cent., while the exports exhibit an even more striking advance by going up from £191,531,758 to £222,810,526. In general, therefore, the volume of business was much more satisfactory in 1880 than during the gloomy period of 1879. In the hardware, metal and tin trades this has proved especially so. English manufacturers of hardware have increased their sales to every country but Australia, in the case of which the falling off is not serious, having decreased from £449,726 to £411,035. The aggregate exports of hardware during the years 1880 and 1879, respectively, were £3,512,011 and £3,028,271, of which £494,207 in 1880, and £335,330 in 1879 were sent to this country, £150,004 and £110,780 to British America, and £165,002 and £409,086, respectively, to the West Indies, Brazil and the Argentine Republic.

The exports of steam engines show a remarkable increase, having risen to £249,294 in 1880 from £187,033 in 1879, while other descriptions of machinery and mill work have jumped from £330,574 in 1879 to £725,949 in 1880. The United States has contributed a share in this improvement, though the aggregate is not considerable, being £82,983 for both classes together in 1880.

In the leading articles of the iron trade the progress made during the year 1880, as compared with the year preceding it, is astonishing, and it is a fact worthy of special attention that the sales to almost every country have very considerably increased. The business with this country, of course, exhibits the greatest fluctuation, and the increase of exports to the United States contributes the largest share to the growth of the trade; but it does not alone account for it, as many other countries again came forward as heavier purchasers, so that England regained all the ground lost during the dull period of 1879, and in many cases did a better business than in the years immediately preceding it. We are not at present in possession of the amounts of the shipments of pig iron and rails, with the exception of those to this country, of which we have both quantities and values. The tables before us, however, show many facts of importance. In the aggregate, the sales of English pig iron to foreign countries foot up to £5,207,294 in 1880, against £3,150,389 in 1879, of which this country has taken £2,278,916 and £873,320, respectively. Notwithstanding the light duty imposed upon foreign pig in Germany, that country has continued to be a heavy purchaser, the shipments direct and via Holland aggregating £1,236,697 in 1880, against £1,064,498 in 1879 and £1,266,242 in 1878. Russia took £503,317 worth of pig in 1880 and £412,930 in 1879; Belgium, £343,417 in 1880 and £194,230 in 1879; and France, £251,931 and £184,697, respectively.

Iron rails have enjoyed a temporary spurt of prosperity, due chiefly, however, to increased orders from this side of the Atlantic, the total value of the shipments having been £908,891 in 1880, against only £293,658 in 1879. Of this increase of £615,233, as much as £516,527 is due to this country. In steel rails a healthier and more substantial improvement is recorded, the total shipments footing up to £3,306,357 in 1880, against £1,950,806 in 1879. Sweden, Norway, Germany, Spain, Italy and Brazil, have fallen off, though not in a serious manner. A more remarkable state of affairs is revealed by the returns in regard to Russia. In 1878 that country took £409,785 worth of steel rails; in 1879 only £222,950, and in 1880 only £61,532. Taken in connection with the fact that during the same time the exports of pig to that country have materially increased, it clearly shows that Russia is taking the first step toward making her own industry independent, by building up the manufacture of the finished article. Besides our own country, which took £384,133 in 1880, against £137,600 in 1879, Canada has drawn a supply of steel rails from England to the extent of £572,104 in 1880, against £343,650 in 1879, while British India has risen from £253,790 to £520,152, and Australia from £238,152 to £452,082.

These figures amply show that the English ironmasters have no reason to complain of the volume of business during the year just elapsed, and that they enjoyed a good demand from other quarters, which is less liable to shrink rapidly than that from this country. We give below in detail the exports of iron, steel and metals from England to this country:

### EXPORTS OF IRON AND STEEL FROM GREAT BRITAIN TO THE UNITED STATES.

	1879.	1880.
Tons.	Tons.	Tons.
Pig iron.....	279,939	612,013
Iron rails.....	20,955	97,853
Steel rails.....	23,681	120,655
Old iron.....	188,705	196,754
Bar, angle and rod.....	20,648	51,015
Hoops, sheets and plates.....	10,447	45,759
Cast or wrought.....	10,437	30,467
Steel.....	9,326	44,099
Lead.....	1,092	213
Tin.....	2,679	7,320

It may be of interest in this connection to compare our total imports with the shipments from England, in order to show approximately what share that country has taken in the movement. Our import statistics have not been published for more than the first eleven months of 1880, but by adding the month of December, 1879, to them we obtain figures which are probably more fairly comparable than if the year 1880 were taken, because the two periods of shipments from Europe and receipts here coincide closely, a fact of great importance in this case, because the amounts fluctuate so considerably from month to month.

### IMPORTS OF IRON AND STEEL INTO THE UNITED STATES DURING THE 12 MONTHS FROM NOVEMBER 30, 1879, TO NOVEMBER 30, 1880.

	Gross tons.	Gross tons.
	1879.	1880.
Pig iron.....	746,616	1,979,979
Bar iron.....	123,867	288,197
Scrap & old iron.....	116,199	116,199
Sheet iron.....	22,682	134,932

A comparison between these figures and those given above, shows that England has furnished us with the bulk of our foreign supply of pig iron and iron and steel rails, but with less than one-half of bar iron, and even a smaller proportion of the enormous quantity of scrap and old iron.

### Underground Telegraph Wires.

The wholesale destruction of telegraph wires by the recent storm, has directed attention more seriously to the expediency of substituting an underground system for wires. The managers of the Western Union say that the subject has been under consideration for a long time; many methods have been proposed and patents examined; experiments have been making constantly, and various data gathered concerning attempts to run underground wires by other companies, without arriving at any definite conclusion. For some time past they have had sixty wires in a cable connecting the Western Union Building with Pier No. 13, N. R., and thence across the river, and also eighty wires to Wall street, which have worked well. The wires are inclosed in an iron pipe 2½ inches in the clear, and can be repaired at any time without difficulty. By means of a tag attached to each wire, bearing a number, any one of the wires can be instantly identified should an accident occur. "Flush boxes" along the street afford openings for the workmen to make any needed change. Said one of the superintending bosses: "We always know what we get hold of." The superintendent remarked that they did not expect to avoid difficulties, whatever the plan that might be adopted. With underground wires there is the difficulty of induction, also in finding an imperishable material, added to which is the question of cost. Gutta-percha, he thought, is the best coating for wire yet discovered, but is expensive. What is known as Brooks' cable has received careful examination as to its practical working. This cable is made of copper wire, covered with cotton or jute, and is drawn through iron pipes filled with liquid paraffine. The latter substance is not only intended to preserve, but to insulate. In its manufacture every effort is made to exclude moisture. The fiber is first boiled in oil, to expel any moisture it may contain, and in every process is carefully kept from the air, until it is finally sealed in the iron pipes. A section of this sort of cable is in use across the St. Louis Suspension Bridge, and the telephone companies have laid down several sections, which are being carefully watched to observe its workings. If it is good for telephones, the inference is that it will answer for telegraph lines. In London they are using gutta-percha very generally for underground purposes, while in Germany they lay down ordinary cables.

The Executive Committee of the Western Union have not come to any determination. They consider it useless to attempt anything in that line if they are not allowed to use the streets, taking up the pavement so far as necessary in laying their lines. Their experience in Jersey City has been peculiarly unfortunate in this respect, for they have had an underground line in complete order between Newark and the outskirts of Jersey City ever since last June, but are prohibited by the authorities from going any further. That underground lines are practicable is not doubted. A gentleman of many years' experience as a contractor, and still holding one of the most responsible positions, affirms with confidence that 1000 wires can be laid in a space not more than 18 inches square; that these wires can be changed at will, and any needed alteration or repairs be made without taking up the street. The patent is still in private hands, awaiting events which may call for its adoption.

The magnitude of the interests involved in the question here discussed, is indicated by the fact that the Western Union alone has between 450 and 500 wires within the limits of New York city. The predicted change, however, is considered inevitable. Telegraphy has become so important that wires are multiplied in all our large cities to such an extent that they form a network

between street and sky, the poles encumbering the streets and destroying anything like architectural effect. But until public opinion finds expression in an imperative demand, we doubt if the companies will do more than talk about burying their wires.

### Our Trade with Greece.

Greece, once the cradle of civilization, has been groaning under the yoke of the Turks for about three hundred and fifty years. When Mohammed II, in 1451, ascended the Ottoman throne, the fate of the Greek Empire seemed to be sealed. At the head of an army of 300,000 men, supported by a fleet of 300 sail, he laid siege to Constantinople, which he took by storm on May 29, 1453. The final conquest of Greece did not, however, take place until 1481. While, therefore, the Moslem rule ended in Western Europe by the simultaneous conquest of Grenada by the Spaniards, it obtained, strange to say, a firmer foothold in Eastern Europe than ever, and, to the everlasting shame of Christendom, the Turks are masters of Constantinople to the present day. The Greeks had to fight a heroic struggle during seven years—from 1821 to 1828—in order to shake off this demoralizing yoke. The Turkish naval power was at length completely destroyed by the combined fleets of Russia, France and England at Navarino on October 20, 1828, and Turkey was compelled to recognize Greek independence. Unfortunately, the jealousy between these powers has ever since prevented the constitution of Greece on a living basis. They left the kingdom crippled and allowed the Turks to retain important Greek provinces. Now that the Turkish Empire is in a state of dissolution, modern Greece is in hopes of eventually obtaining these provinces; but, judging from the obstinacy with which Turkey eludes the rectification of the Greek frontier, decreed in principle at Berlin in June, 1878, the aggrandizement of Greece will be delayed till the next great Eastern war.

But small and ill-constituted as Greece is, she has nevertheless advanced rapidly of late years. In 1870 the population of Greece amounted to 1,457,894. Last year's census shows it to have swelled to 1,679,775; in 1838 the population did not exceed 850,000. Athens counted 48,000 inhabitants in 1870; it now has 74,000. The Piræus, the port of Athens, has doubled in population since 1870, now counting 22,000.

The soil of Greece is stony and scantily wooded. It is mountainous and produces comparatively little, except in the Ionian Islands, ceded by Great Britain, where the famous currants are grown. If Greece possessed the fine provinces still held by the Turks, she would be able to produce food abundantly, and become, besides, one of the manufacturing nations of Eastern Europe. As she is situated, she has been limited to trade and navigation, and has become one of the principal carriers in the Mediterranean. Her merchants have established branch houses at Constantinople, Alexandria, Malta, Marseilles, Naples, London, Liverpool, New York, Calcutta and Rio, and the Greeks have become powerful in commerce. A nation which has been able to accomplish so much in half a century with such scanty means as they possessed, assuredly must be gifted with mental qualities of the first order, and they are conscious of these qualities; hence their patriotism and their ambition to become one of the great elements of Eastern civilization after the Turks shall have disappeared from the scene. Not being a manufacturing nation, they look to Central and Western Europe for manufactures, and are consuming large amounts of them, as we shall show.

Greece covers an area of 19,324 square miles, and under the new army organization of July 18, 1877, can place on a war footing 200,000 men. She conquered her independence with 50,000 soldiers. The Greek fleet is small, comparatively speaking, consisting of 1 ironclad frigate, 1 monitor, 8 screw steamers and 11 sailing vessels, manned by 71 officers and 581 men.

### GREECE'S GENERAL TRADE—1875—IN THOUSANDS OF DOLLARS.

	Import.	Export.
Great Britain.....	6,258	8,117
Turkey.....	4,608	1,810
Austria.....	3,173	1,977
Russia.....	3,066	676
France.....	3,754	468
Italy.....	1,371	69
Other countries.....	673	1,395
Total.....	22,597	15,158
Trade of 1874.....	19,719	13,029

The chief articles imported in 1875 were:

Breadstuffs.....	\$5,770,000
Dry goods, hardware, &c.....	4,705,000
Hides.....	1,952,000
Sugar.....	1,000,000
Lumber.....	1,054,000
Cattle.....	594,800
Provisions.....	580,260
Coal.....	531,800
Coffee.....	462,220

and those exported:

Currants.....	\$7,569,660
Olive oil.....	2,586,600
Hides.....	1,054,800
Lead.....	842,800
Flax.....	801,800
Gall nuts.....	349,800
Liquors and wine.....	239,400
Tobacco.....	219,200
Cotton twist.....	219,600
Silk.....	192,800
Soap.....	171,200

### MARITIME MOVEMENT—ENTERED AND SAILED.

Coastwise.....	121,090	4,495,406	129,618	4,254,142
Total....	142,522	8,045,431	151,149	8,095,439

In 1876 there were navigating under the

In 1876 there were navigating under the

Greek flag 5440 vessels, with an aggregate tonnage of 262,032 tons, manned by 26,760 sailors. The fleet comprised 4303 vessels under 60 tons, measuring together 4371 tons, and 27 steamers, measuring together 8241 tons.

In point of railroads, Greece is the most poorly endowed country in Europe. There is only the line from Athens to the Piræus, about eight miles in length. She makes up for it in telegraphs, having in operation in 1875, 1616 miles of lines, with a length of wire of 2000 miles, and 60 offices, dispatching in that year 249,673 telegrams. There are 140 post offices with 481 employees, dispatching in 1876 some 3,066,630 letters and 1,995,939 newspapers. The post office collected \$117,044 in postage, and spent for its administration \$83,502. The public debt of Greece amounts to \$96,616,581.

The general trade movement shows that Greece imports largely in excess of her exports, which is explained by what we have said. Being chiefly a carrier and trader between foreign nations, Greece receives a great deal of freight, and profits on dealings, in the shape of money and merchandise, while producing comparatively little herself.

The trade between the United States and Greece was moderate in extent until the year 1878. It was, in thousands of dollars:

Fiscal year.....	1871.	1872.	1873.	1874.	1875.	1876.
------------------	-------	-------	-------	-------	-------	-------

Import from Greece..... 298 308 414 484 435 360

Don't export to Greece..... 33 72 51 33 33 143

The principal import article from Greece is currants, of which we received \$523,128 worth in the fiscal year ended June 30, 1877. The chief article exported to Greece up to 1878 was petroleum, of which \$190,170 was shipped during the fiscal year ended June 30, 1877, and \$143,235 the previous year. When the war between Russia and Turkey broke out, Greece felt called upon to arm, and drew from the United States a considerable amount of war material in the shape of ordnance stores, &c., among which were:

Cartridges.....	\$2,004,500
-----------------	-------------

Manufactures of iron..... 255,000

Manufactures of steel..... 1,210,184

Total..... \$3,469,683

And adding petroleum..... 38,025

Total..... \$3,507,708

This represents the shipments of domestic goods from this country to Greece during the fiscal year ended June 30, 1878.

Our export of war material to Greece is certainly better than no export at all, although it is but a temporary affair, and as our trade with Mediterranean countries gradually expands, the Greeks will soon discover that they can get hardware and a good many other articles, such as woodenware, as cheap as from Western Europe. An extension of steamship lines beyond Sicily to Greece, Constantinople and Alexandria would materially assist in fostering trade with the Ionian Islands and Athens, and the time may not be distant when our large importations of Greek currants may cause the owners of these steamship lines to add the more Eastern ports in the Mediterranean to their regular service. At all events, there is a promising field in that vicinity, to which we invite the attention of our merchants and manufacturers.

### An English National Free Trade Union.

The English Chambers of Commerce have been for two years at work to accomplish that for free trade which this country has had from the first—absolute, unrestricted free trade between every part of its dominions. From the beginning of our government one of our "broad principles" has been this freedom of trade between all parts of the United States, a principle that has been jealously guarded, and one that, when an attempt has been made on the part of certain States and communities to abridge this right, has been put aside by our Supreme Court, as in the celebrated Maryland case early in our history. England, however, in her desire to secure free trade or its near approach with this country, has entirely neglected this phase of trade, and has allowed certain restrictions to grow up in the colonies that prevent this free trade in her own dominions, and now her commercial bodies are moving in the matter. A recent number of the *Ironmonger* states that "in the last week of February an important conference of the representatives of the Chambers of Commerce in different parts of the empire will be held in London, on the subject of free trade and the best means of creating uniformity in the customs duties throughout the Queen's dominions." The arrangements for the conference have been nearly two years in course of preparation, and it is anticipated that all parts of the empire will be represented by delegates. The different Chambers in England will send 48, Canada 10, India 9, and the other colonies from 2 to 4 each. The broad proposal to be submitted to discussion is that by uniform, or at least reciprocal, fiscal regulations all parts of the British Empire should be induced to trade with each other, rather than with "foreign countries."

This is another concession to the American idea that free trade and protection are national, not international questions, and are to be decided as national questions.

It may be interesting, as bearing on the question of the ore supply of this country for 1881, to note that next June the govern-

mental concession of the iron mines of Elba to Bastogi & Co. will terminate, and the question is now being discussed between the Italian Minister of Marine and the Minister of Agriculture and Commerce whether to renew the lease, or whether the government will take the mines into their own hands. Some time ago they entertained the idea of establishing a large foundry at Elba, in order to work the iron ore on the spot. The ministry of Italy, in view of the constant deficit in revenues and to encourage home industry, are seriously discussing the question of directly operating the mines and making constructive material.

An organization of the mining engineers of Ohio has just been formed at Columbus, somewhat on the plan of the one in the anthracite regions of Pennsylvania. The membership will be restricted to those interested in the ownership and management of mines, and civil and mining engineers in practice. The institute proposes to meet twice in each year, and read and discuss papers on subjects affecting the working and ventilation of mines, the mineral resources of the State, the preservation of mining plans and kindred subjects. The following officers were elected for the ensuing year: President, Andrew Roy, Columbus; vice-president, Fred. Howell, Zanesville; secretary and treasurer, R. S. Paul, Akron.

### The Egyptian Obelisk.

In accordance with his promise, Commander Goringe swung the obelisk into position on its base at noon on Saturday last. At precisely two minutes before 12 o'clock, nautical time, a carriage containing Mr. Everts, Secretary of State; Gen. Goffe, Secretary of the Navy and others, drove up through the crowd of vehicles. Lieutenant Commander Goringe greeted its occupants, and rapidly ascending with them the Graywacke Knoll announced his readiness to proceed at once with the work of throwing the monolith into position. Secretary Everts, after a few moments' conference with his companions, turned and requested Lieutenant Commander Goringe to give the signal to his men for turning the vast shaft in air. At that moment the great monolith lay, delicately poised on its trunnions, at a height of about 40 feet from the ground, and covered with snow and ice. The preparations for turning the stone were amazing in their simplicity. At the small end of the obelisk was a short 1½-inch wire rope, which was connected to a chain anchored to the westward about 60 feet distant, by means of a three-fold purchase, having the hauling part rove through a snatch-block, made fast alongside of the anchor and leading to a capstan on the southwest side of the foundation.

At the base there was also a three-fold purchase with one block, made fast to the clamp near the base, and the other attached to a toggle on the west of the foundation wall. The hauling part was made fast to a pin driven into the ground alongside the capstan. At the word of command the men began to haul gently on the down-haul, and the men at the capstan gradually released the top. When the obelisk reached an angle of 45 degrees, Lieutenant Commander Goringe waved his hand and ordered the men to hold it in position until a photograph of it had been taken. This was done almost instantaneously. "Lower away!" shouted Lieutenant Commander Goringe, and as easily and delicately as if it were the minute-hand of a lady's watch, the colossal stone moved again and steadily swung into an upright position. Two hundred and nineteen and a quarter tons of stone, distributed in a length of 69 feet 2 inches, are not turned into mid-air every day. As the heel of the great stone, pulled upon through reeves and blocks by half a dozen sturdy workmen, began to descend, the spectators, who crowded one another in the winter snow and stood many rows deep behind the marines and sailor boys, set up cheer after cheer. If the camera has not done an injustice, the photographs taken when the monolith was half swung down should be in large demand, for the scene was brilliantly picturesque. Outlined against the snow at the north was a splendid line of troops from the U. S. Marine Battery at the Navy Yard, under command of Captain Henry J. Bishop, their light blue, bright uniforms making a fine contrast with the black mass of people who crowded the knoll behind them. On the left of the line was the Marine Band, its brass shining in the sunlight and its scarlet hat bands glowing. Along the inner edge of the broad drive which fronts the Metropolitan Museum, and under a floating national flag, was drawn up a line of sailor boys in navy-blue and white leggings. These men were from the Minnesota under Lieut.-Commander W. H. Whiting.

Lieutenant Commander Goringe's order to "Lower away" was quickly followed by another, "See that the bolts are clear," and "Haul in the heel tackle." Immediately the great needle began to move. Its finely cut apex went up and its unevenly rounded heel descended. "Don't slack too much—easy now!" called out the Commander. Captain Bishop shouted his order to the band, "Prepare to play 'Hail Columbia,' and play it with a will!" The Rev. Dr. Prime, standing near, called for "Three cheers for Commander Goringe!" They were given with a will. Slowly the butt descended. Commander Goringe, with his hat off, extended his left hand, and looked past the palm to note the moment when the stone should fall into the perpendicular. When the moment arrived he said, "Belay all!" and the obelisk rested. True he descended from the timber on which he had been standing.

The entire operation of swinging, including the delay for the photograph, consumed five minutes. Commander Goringe remained on the ground till 8.15 p. m., when the obelisk was finally and exactly lodged on its pedestal. Nothing now remains to be done to the obelisk but to put the crabs under the shaft, remove the machinery and tear down the

masonry built to sustain the tower and trunnions. This is the work of a few days. Our New York obelisk was one of a pair erected by the famous Thothmes III, whose legend is engraved in the central column of each side. He was the son of the first Pharaoh of that name, brother of the second, and father of the fourth and last; came to the throne May 7, B. C. 1515, and reigned 53 years, 10 months and 26 days. Only little by little as he grew to man's estate did his great and ambitious sister, the Regent Hatshepsut, who had consigned him to seclusion in a temple in the Delta marshes, grudgingly share with him his stolen prerogatives. He repaid her by appropriating most of her monuments, so that it cannot easily be said which should be attributed to her. He occupied a subordinate position when she sent forth her great fleet down the Red Sea to coast Cape Guardafui and make the adjacent country of Pount an Egyptian dependency. But not long after this the young prince emancipated himself from petticoat government, and in 15 brilliant campaigns, between his 22d and 42d year, capturing Kadesh, winning battles on the Euphrates and even on the Tigris, and routing the Syrian kings and the confederates in the famous fight at Megiddo. "Egypt," so ran the phrase, "set her frontiers where she pleased herself." In Africa his conquests spread beyond Etkopia to Khartoum in the south and Algeria in the north; the waters of the Black Sea were controlled by the sails of his fleet, and the rivers of Northern Europe rippled by the oars of his galleys. By him was our obelisk erected before the Temple of Amen, at Heliopolis, where, doubtless, it was seen with awe by Moses in his youth studying there the "wisdom of Egypt." According to Pliny, whose statements must be taken with considerable reservation, Thothmes, or, as he writes the name, Mesphros, was "warned" to erect this monolith in a dream; "indeed, there is an inscription upon the obelisk to this effect, for the sculptures and figures which we see engraved thereon are no other than Egyptian letters." Certainly the monarch may have been led by a dream to design the erection of the obelisk, but there is no record of the circumstance in the hieroglyphic inscriptions. The obelisk is 69 feet 2 inches high by 7 feet and 8 inches wide at the base. It is of red granite. It stood upon a limestone pedestal, resting upon three steps, and when first set up had only a central vertical column of inscriptions bonorific of the sovereign erecting it. Ramesses II., the "beloved of Amen," and the great builder of temples and palaces, appropriated the obelisk and added two outside lines in his own praise upon each face.

The monolith was destined to be associated with the name of another sovereign, and a greater than Ramesses or Thothmes. In the eighth year of his reign Augustus Caesar, desirous of commemorating his victory over the last of the Ptolemies, removed it from Heliopolis to Alexandria, and re-erected it in front of the temple called the Caesareum, which he had himself founded, and which was for centuries one of the glories of Alexandria. This removal took place during the prefecture of Pontius Rubrius Barbasus, who was the fourth prefect of Egypt under Augustus Caesar. On attempting to re-erect the obelisk it was found that the lower portions had been so much corroded and suffered so much dilapidation that the Roman engineers, instead of imposing it flush upon its base, preferred to support the monolith upon four bronze crabs or feet. This plan, which was afterward generally followed in Rome, caused the ultimate overthrow of all the obelisks set up by the Caesars; first, on account of the inequality of the tension; and, secondly, because the bronze was a metal too valuable to be suffered to remain when the period of ruin set in. Mr. John Dixon, in clearing the soil from the fallen obelisk which lay beside this one, preparatory to its removal to London, excavated out also the base of the New York obelisk, and discovered one of the bronze crabs which supported it still in situ, the others having long since been wrenched away. Upon this crab or claw were found on either side two inscriptions—one in Greek, the other in Latin—fixing precisely the date of the erection of the monument. The inscription is, in English, as follows:

In the eighth year  
Of Augustus Caesar,  
Barbasus, prefect  
Of Egypt, caused this obelisk to be  
placed here  
Pontius being architect.

Thus the votive monument of the Pharaohs became a Roman trophy, and that obelisk which had been constructed at vast expense and labor to record the majesty of the Egyptian Empire, three of whose greatest monarchs were associated with it, was now, by remorseless fate, transported and transformed to declare the subjection of the province of Egypt. It is obvious that as the famous Queen Cleopatra died in the second year of Augustus, while this obelisk was removed to Alexandria in his eighth, or B. C. 23, she could have had nothing to do with it. The connection of her name with it is an anachronism. Not the less is it a consecrated anachronism, as the title has been borne by our monolith for ages past, and it has been familiar to all Christendom as "Cleopatra's Needle" during the whole period of the modern history of Europe and America.

The inscriptions of Thothmes and of Ramesses on our obelisk have been thus carefully translated by the accomplished Egyptologist, Brugsch Bey:

No. 1.—Central Column of Thothmes III.  
Horus, who bears high the diadem of Upper Egypt, beloved by Ra the king of the two lands (Ra men cheper). Horus crowned with victory and rejoicing, who strikes the princes of the foreign countries, whose are his when ever he raises his war-hatchet to give to Ra power over all the countries. All the strength is united in his hands to increase the joyfulness of the Son of the Sun, who is endowed with power, life and constancy (Thothmes).  
No. 2.—Central Column of Thothmes III.  
The kingly Horus, powerful Bull, crowned in Thebes, the lord of the diadems, whose royalty is expanded like the sun in heaven. (Beloved of Am. Lord of Heliopolis, son of the lions, that created him Thothmes). They created him in the great abode, from the perfection of their lines, so that he will make an extended royalty for centuries. The King of Upper and Lower Egypt (Ra men cheper). Beloved of Tum, the Great God, and the gods of his circle, giving all life, stability and happiness like the sun forever.

No. 3.—Central Column of Thothmes III.  
The royal Horus, the powerful Bull, crowned in Thebes, the King of Upper and Lower Egypt (Ra men cheper).

No. 4.—Central Column of Thothmes III.  
The royal Horus, the powerful Bull, beloved by Ra, the King of Upper and Lower Egypt (Ra men cheper).

No. 5.—Central Column of Ramesses II.  
The kingly Horus, the powerful Bull, son of the Sun, the King of Upper and Lower Egypt, the Lord of the diadems, who protects Egypt and chastises the nations, son of the Sun (Ramesses meri amon), heroic king, active with his hands on the surface of the world (Ra user ma Sotepen Ra, son of the Sun, Ramesses meri amon), living to eternity, like Ra.

No. 6.—Horus, the powerful Bull, beloved of Ra, the King of Upper and Lower Egypt (Ra user ma Sotepen Ra), Lord of Panegyrics, like his father, Ptah Sotepen, son of the Sun (Ramesses meri amon). Ra has generated him to set in festivity On (Heliopolis) and to accumulate offerings in the temples which he has generated, the Lord of the two worlds (Ra user Sotepen Ra, son of Ra Ramesses meri amon), giving life to eternity, like god Ra.

No. 7.—The kingly Horus, powerful Bull, beloved by Ra, the King of Upper and Lower Egypt (Ra user ma Sotepen Ra), sun generator of gods, lord of the two lands, son of the Sun (Ramesses meri amon), a noble youth of kindness like Aten, blazing at the horizon, lord of the two lands (Ra user ma Sotepen Ra), son of the Sun (Ramesses meri amon), the splendor of Osiris, vivifier.

No. 8.—The kingly Horus, the powerful Bull, son of Cheper Ra, the King of Upper and Lower Egypt (Ra user Sotepen Ra), the golden hawk, of abundant years, victor, son of the Sun (Ramesses meri amon), who issued from the womb to take the crowns of the sun, who is generated by the sun to be sole lord, master of the two lands (Ra user ma Sotepen Ra, son of the Sun (Ramesses meri amon), the splendor of Osiris, like the sun.

No. 9.—The kingly Horus, powerful Bull, beloved of Ra, the King of Upper and Lower Egypt (Ra user ma Sotepen Ra), a son-generator of gods, lord of the two lands, son of the Sun (Ra mession meri amon).

No. 10.—The kingly Horus, powerful Bull, son of the Sun, the King of Upper and Lower Egypt (Ra mession ma Sotepen Ra), the golden hawk, son of the Sun (Ra mession meri amon).

No. 11.—The kingly Horus, powerful Bull, beloved by Ra, the King of Upper Egypt (Ra user ma Sotepen Ra), lord of the panegyrics, like his father Ptah, lord of the two lands, son of the Sun (Ra mession meri amon).

No. 12.—The kingly Horus.

The square tableau on the pyramid of the obelisk shows the god Ra and King Thothmes III, seated on a throne; before them the Sphinx, emblem of physical and intellectual force.

The names in italics are names of divinities, and those in small capitals are names of kings.

The obelisk, like the pyramid, is a solar emblem, probably representing the rising, as the pyramid probably represents the setting, sun. Any single vertical monolith not exactly a column is commonly described as an obelisk, but the description is not correct. An obelisk, or *tekhén*, is a monument composed of a single quadrangular upright stone, having its four sides inclined toward each other, and, in section, all its angles right angles, and all its sides parallel to each other. Its height is not less than that of ten diameters taken at the base, and its apex is abruptly terminated by a small pyramidion, whose faces are inclined at an angle of about 60 degrees. An obelisk was generally supported on a quadrangular base, in height approximating a cube and a half, and which is also, like the obelisk, formed of a single stone, further supported by three broad and deep steps. The sides of an obelisk or its base need not have in section the same width, provided that each opposite side is exactly equal, but all the lines of the monument must be right lines and it must have no more than four sides. It may be inscribed or not, but the ornamentation is never in relief other than the low, sunken relief used in Egyptian art, and the inscription is always vertical with the lines of the monument and not horizontal. The obelisks of earlier periods are generally the largest and simplest in execution. The material is granite or a hard sandstone, capable of being well cut and of receiving a high polish.

The red granite of Syene was most commonly used—27 of 42 known obelisks, including our own, being of that material. When the faces of the pyramid were not sculptured with votive vignettes, it was covered with a cap of either bronze or gold. The obelisk was considered the special and technical symbol of the all-powerful Ra, the rising and mid-day sun, inasmuch as its sharply defined lines and narrow proportions, conjoined with its immense height, gave no imperfect representation of a ray of light seen darting vertically downward through the crevices of gathering clouds. Granite was chosen as representing the eternal sun, and the color (red) was selected as analogous to the hue of the sun's disk viewed across the sands of the Libyan Desert.

Syene (Assuan), "Egypt's extreme boundary, where Juvenal pined in exile, where the first cataracts burst through the gates of Egypt, where are the grand quarries which have supplied all the roseate granite obelisks of Egypt" is well-nigh 750 miles from Alexandria, so that even to reach the Nile delta the obelisk saw not a little travel. One unfinished needle, not yet reft from the parent rock, still lies in the quarries as if but recently and temporarily deserted by the workmen, to show how the work of preparation was done. In the course of the line which marks the boundary of the shaft is a sharply cut groove, all along which at short distances are holes, into which dry wooden plugs were firmly driven; then the groove was filled with water, the wedges swelled and a fragment over a hundred feet long and 12 feet square was cracked away. A coarse saw was perhaps used to deepen the cuts.

When the mass of stone was nearly all cut through, the sustaining props were knocked away and the obelisk was allowed to break itself off from the rock by its own weight, a rather singular proceeding, which risked the safety of the monolith.

There are no two sides of the obelisk or of the pedestal equal in width, and the sections through it are trapeziums. All the squares are calculated through their axes:

Height of obelisk to pyramidion..... Ft. In.  
61 7  
Height of pyramidion..... 7 7  
Height together..... 69 2  
Square at base..... Ft. In.  
5 3 3/4  
Square at top..... 3 3  
Height of pedestal..... 6 11  
Height of pedestal with obelisk..... 76 1

Square of pedestal at base..... 9 3  
Square of pedestal at top..... 9 1  
Height of bottom step at foundation..... 1 5/8  
Height of middle step at foundation..... 1 7/8  
Height of top step at foundation..... 1 5/8  
Height of foundation, pedestal and obelisk..... 80 1  
Width of bottom step..... 1 6  
Width of middle step..... 1 2 1/2  
Square of foundation at base..... 17 8  
Square of foundation at top..... 12 3 1/2  
Height from drive to tip of obelisk..... 12 7  
Elevation of site above mean high water..... 101 6  
Height of tip of obelisk above mean high water..... 101 6  
Weight of the obelisk..... 210 1/2 Tons  
Weight of the pedestal..... 49  
Weight of the foundation..... 8 3/8  
Total net weight..... 356 1/2  
The obelisk has been moved, since it was taken down, 5382 nautical miles by water and 11,520 feet by land.

### WASHINGTON NOTES.

The Hoop Iron Question—The Eaton Bill and the Tariff—The Treasury Rulings on Tank Iron—Inter-State Commerce.

(From Our Own Correspondent.)

WASHINGTON, D. C., January 26, 1881.

The following gentlemen representing the hoop-iron interest, James McCutcheon, of Lindsay & McCutcheon; John L. Kennedy, of Painter & Sons, and Mr. Townes, of William Clark & Co., of Pittsburgh; Henry Wick, of the Youngstown Rolling Mill, and Mr. Cartwright and W. H. McCurdy, of Cartwright, McCurdy & Co., of Youngstown, Ohio, and James Carnes, of Kimberly, Carnes & Co., Sharon, Pa., had a hearing before Secretary Sherman, on the 22d inst. Through the free-trade Assistant Secretary who gives out the decisions or rulings of the department, this question had become somewhat mixed, and the gentlemen named came here to have a plain talk with the Secretary on the subject. The Secretary invited Assistant Secretary French and Mr. James, chief of the customs division in the Secretary's office, to be present.

The attorney of the hoop-iron interest said that there was not much to say that was new, as the question in various forms had been gone over several times; he would confine himself strictly to presenting the salient points of the subject. What the hoop-iron industry wanted was some definite construction of the law. The fact that a strip of hoop iron had a rivet on it and was varnished, did not constitute it an article of manufacture to be taken out of the category of hoop iron at a specific rate of 1½ cents per pound, and make it 35 per cent. ad valorem. He then took exception to the decision that a certain class of cotton tie with a fixed buckle should be classed as a manufacture of iron not otherwise provided for.

Mr. McCurdy, of the firm of Cartwright, McCurdy & Co., thoroughly explained the difference in cotton ties. A tie, consisting of a strip of hoop iron 11 feet long, was nothing more than an attempt to evade the duty; and, pointing to the riveted end, remarked: "That, gentlemen, is the dishonest end, and the other without the rivet is the honest end." He said that the putting the rivet in cost \$1 a ton to the English manufacturers, and \$18 a ton loss of revenue to the government.

Another attorney spoke on the law and ethics of the case, claiming that the question now is whether a little varnish and a buckle puts it out of the specific rate.

Mr. McGinnis, representing the working classes in this industry, spoke of the suffering which would follow a loss of protection, and hoped the Secretary would promptly and satisfactorily decide.

It is evident, from the number of petitions being received here, that the manufacturing interest of the country is thoroughly aroused on the tariff question. The bill introduced into the Senate by Mr. Eaton, December 17, 1879, and reported back April 13, 1880, by Mr. Bayard, from the Committee on Finance, with certain amendments, passed that body and is now on the calendar of the House. The petitions received here by Representatives from all the tariff districts are of such a character that they cannot be disregarded. They include individuals, companies, corporations, and manufacturers who not only represent the great iron manufacturing industry, but other influential elements. These petitions come from New York, Philadelphia, Boston and innumerable small places more or less affected by incessant talk of changes in the tariff laws.

The tariff question, at any rate, has lost an immense amount of caste among the Democrats since the Presidential election of November, 1880. This feeling has grown to such an extent that a Democrat will have nothing to do with the subject. Representative Tucker informed your correspondent to-day that his hoop iron bill was dead; that it would be needless to bring it up, as he was doubtful whether it would receive the support of even a fraction of his own party, so that the duty on hoop iron, so far as the House of Representatives is concerned, will remain at its present specific rate.

The Committee on Ways and Means yesterday put a quietus on Mr. Frank Hurd's Cobden Club tariff resolutions, by determining to make an adverse report.

There is every prospect of the passage of the Eaton bill, now on the calendar. Several Democrats will make an effort to get it up. As this subject is now attracting public attention, we reproduce the bill in full:

A BILL to provide for the appointment of a commission to investigate the question of the tariff.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled, That a commission is hereby created, to be called the "Tariff Commission," to consist of nine members.

Sec. 2. The President of the United States shall, by and with the advice and consent of the Senate, appoint nine commissioners from civil life, one of whom, the first named, shall be the president of the commission. The commissioners shall receive as compen-

sation for their services, each, at the rate of ten dollars per day when engaged in active duty, and actual traveling and other necessary expenses. The commission shall have power to employ a stenographer and a messenger; and the foregoing compensation and expenses to be audited and paid by the Secretary of the Treasury.

Sec. 3. It shall be the duty of said commission to take into consideration and thoroughly investigate all the various questions relating to the agricultural, commercial, mercantile, manufacturing, mining and industrial interests of the United States, so far as the same may be necessary to the establishment of a judicious tariff or a revision of the existing tariff upon a scale of justice to all interests; and for the purpose of fully examining the matters which may come before it, said commission, in the prosecution of its inquiries, is empowered to visit such different portions of the country as it may deem advisable.

Sec. 4. The commission shall report to Congress the results of their investigation, and the testimony taken in the course of the same from time to time, and make their final report not later than the first Monday in December, 1881.

There is much complaint to members of Congress by manufacturers of tank iron, that the rulings of the Secretary of the Treasury in reference to the importation of this class of iron are unjust. The proprietors of the Valley Iron Works, at Coatesville, Pa., in a letter complain that large orders have gone abroad for tank iron, which is imported as worked iron at a duty of 35 per cent. The complaint is that under a ruling of the department this iron can be laid down in New York at 2½ cents per pound, while no American mill can put down the same iron, without the additional labor of punching, for less than 2.6 cents per pound. It is claimed that something must be wrong if this same iron, which when imported plain without punching pays a duty of \$30 per ton, can be admitted, with the additional labor placed thereon, at 35 per cent. duty. The leading oil companies are importing iron in the advanced state of manufacture at lower rates than the mills can make it.

The friends of the Inter-State Commerce Bill are making renewed efforts to secure its consideration, at least in the House. The McLane substitute seems to attract most attention, providing for a Board of Supervisors of Inter-State Commerce and Railroads, consisting of the Secretary of the Interior, Assistant Secretary of the Interior, the Auditor of Railroad Accounts (to be styled the Commissioner of Railroad Affairs), the Railroad Engineer in the office of the said Commissioner of Railroad Affairs, and an officer or employee of the Department of Justice, learned in the law, to be designated by the Attorney-General. Though a somewhat cumbersome arrangement, this plan is favored, as the Reagan bill creates a board of three commissioners as a Bureau of the Interior Department, the officers to be appointed by the President for a term of six years. This McLane substitute limits the general supervision of the board to charges made by common carriers and the safety of travel and movement as affecting Inter-State commerce; to investigate complaints in regard to charges by common carriers; may summon and compel witnesses to appear and produce books and papers; may compel compliance on the part of common carriers to obey any changes recommended in the way any common carrier conducts his business; it also compels all railroads and common carriers to report annually their operation to the Board. The substitute also provides additional compensation to the officers performing this extra service. The McLane scheme has the merit of organization commensurate with the importance of the interests involved. The Reagan scheme, though very acceptable, is regarded as crude in some particulars. The McLane substitute, from all indications, is the most likely to be adopted, if any, at this session.

The Department of State is in receipt of the latest tariff schedule of the government of Gueloupe. The following are the duties on the imports named, the full schedule being very lengthy: Cutlery, ad valorem, 10 per cent.; copper, per 100 kilos, 16 francs; coal and coke, per ton, 1 franc; fire arms, ad valorem, 15 per cent.; iron in bars, per 100 kilos, 1 franc; iron, galvanized, per 100 kilos, 2 francs; iron, plated, per 100 kilos, 5 francs; lead, per 100 kilos, 5 francs; nails, per 100 kilos, 3 francs; saddlery, ad valorem, 10 per cent.; zinc (paint) per 100 kilos, 6 francs; zinc, per 100 kilos, 5 francs.

### NEW PUBLICATIONS.

THE JOURNAL OF THE IRON AND STEEL INSTITUTE, 1880. No. II. Published by E. & F. N. Spon, London and New York.

The second part of the proceedings of the Iron and Steel Institute contains the papers read at the Dueseldorf meeting, with the discussions, and an account of the visits made to the various iron and steel works of Germany's greatest producing districts. The volume again contains Mr. J. S. Jeans summary of progress, in which we would note some improvement.

English Blast Furnaces.—The Iron Trade Circular publishes the following list, showing the number of blast furnaces in operation in Great Britain on the 30th June and 31st December, 1880:

	—Fur. Built—	—Fur. in blt—
	June Dec.	June Dec.
England.		
Cumberland.....	38 24	15 47
Derbyshire.....	54 57	39 43
Durham.....	59 60	25 26
Gloucestershire.....	9 9	2 2
Hampshire.....	1 1	0 0
Lincolnshire.....	18 18	14 15
Lancashire.....	51 51	24 31
Northamptonshire.....	21 25	15 17
Northumberland.....	4 4	4 4
Staffordshire, South.....	146 146	43 44
Staffordshire, North.....	37 35	21 21
Somersetshire.....	1 1	1 1
Shropshire.....	25 25	12 11
Wiltshire.....	7 7	3 3
Yorkshire, W. Riding.....	48 49	31 31
Yorkshire, E. Riding.....	101 101	54 50
Wales.....	636 644	373 385
Scotland.....	10 10	7 6
South.....	151 154	73 79
Scotland.....	150 151	116 124
Total.....	947 959	559 590

### Polytechnic Club of the American Institute.

#### The Eleventh Street Boiler Explosion.

The president, Mr. Stetson, opened the discussions of the evening by bringing up the subject of the explosion of the boiler in Eleventh street, belonging to the Methodist Book Concern Building. It will be remembered that the boiler exploded at about 20 minutes to 5 on Sunday afternoon, January 16. The boiler was one of a pair placed under the sidewalk. It was 16 feet long, 34 inches in diameter, with a 32 inch drum 24 inches high. The head of the drum was fitted with a manhole of larger size than usual. The head of the steam drum was flanged in the usual way, and held by six stays. The boilers are about 12 years old, and were inspected in August and tested to 100 pounds. They were allowed to carry 70 pounds per square inch, and at that point the safety valve was set.

After the opening statement, Mr. Blanch-

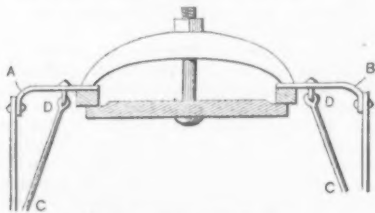


Fig. 1.—Form of Dome.

ard said that probably in this, as in most similar cases, somebody had lied, and this was a very common explanation of boiler explosions. If we take the account of those in charge, nobody is ever careless or neglectful. They say that they have just looked at the gauges, examined the fires, noted the height of the water, and that, so far as human knowledge could go, everything was all right. Now, there is a great amount of carelessness incident to all human action, and those in charge of our boilers are no exceptions to the general law. It is natural, after the accident happens, that they should make the best possible story for themselves, and they do so accordingly.

Mr. Sutton: "I want to know what carelessness had to do with this explosion. Blame enough falls on engineers without attributing it to them, when sufficient reasons for the explosion can be found without impeaching them. This boiler was of the poorest character in some respects. I examined it but a short time after the explosion, and what I saw satisfied me as to the causes. The top of the drum, with its manhole plate, blew out of the boiler without disturbing the boiler itself, and left each and all of the six braces standing in place. The bolt had drawn from the plates and the head had gone. It was torn out without disturbing the rivets which secured the flange to the dome. A poor piece of iron had been used for the head; it was placed within 9 inches, or thereabouts, of the side-walk, where it could not be examined, and leakage and dripping from above, very likely, added corrosion to weaken the already unsafe sheet. The head was flanged in the usual way, and riveted inside of the drum. In its center was a large manhole opening, the edges of which were strengthened in the usual way. When in place the whole was a tolerably rigid mass. This head had broken out clean at the line where the plate was burst in flanging. Supposing the break started in the bend at some point parallel with the line of the fibers of the plate, it is evident that the head tore out, drawing the bolts one at a time, and finally letting go, went out bodily. Under other circumstances a crack would have been a crack only, and have allowed an escape of steam; here, in the poor iron, it tore along in the weakest part. Such a plate would have a grain almost like wood, and at certain portions would be exceedingly weak. The stay, although of the poorest possible form (welded eyes on a round rod), were all uninjured." In reply to questions, Mr. Sutton said that the iron was fibrous, but that his opportunities were somewhat limited, as a policeman was pushing him pretty hard to

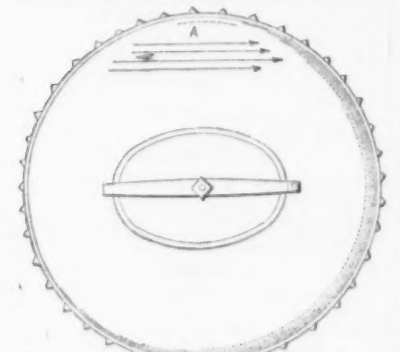


Fig. 2.—Plan of Head.

get him out of the way, and he did not wish to say that he was an expert.

The accompanying sketches, made from Mr. Sutton's drawings upon the blackboard, illustrate the points made.

Fig. 1 shows, in a general way, the form of the head of the steam dome with its manhole plate, &c. The points A B show the position of the break where the head separated from its flanges. C C are the stays and D the round eyes, the welds of which had not opened. Fig. 2 shows a plan of the head; the horizontal arrows show the supposed line of the grain of the iron, or the direction in which it passed through the rolls. A break beginning at A would be splitting the fibers, rather than breaking them in two. Fig. 3 is a diagram showing the general arrangement of the boiler and dome; the dotted line shows the position of the head that was blown out.

Mr. Sutton's report was particularly valuable, as his great experience enabled him to take in the salient features of the explosion before there had been any meddling with the wreck.

Mr. Partridge said that there was one fact not generally known which should re-

ceive attention, as it might throw light upon the cause of the high pressure in the boiler. Automatic pressure records show that when boilers are banked at night with a low pressure of steam, the pressure remains nearly constant for some hours; but as the heat penetrates the fresh coal on top of the fire and it begins to burn more strongly toward morning, say at 3 or 4 o'clock a. m., the pressure gradually creeps up, until it often reaches the boiler pressure of the daytime. It might have happened that the 3-pound pressure at 1.30, observed by the engineer, was correct, and that the fire burned faster than usual, so that at the time of the explosion the pressure was fully up to 70 pounds.

Mr. Sutton: "It is reported that the dampers were found open after the explosion. Didn't these dampers blow open? Such an occurrence is one of the commonest experiences with practical men when anthracite is used. Do not say a word against the engineer, for doors and dampers might have been thrown open by a gas explosion after he left, as often happens after banking a fire." The example of the frequent gas explosions, on a small scale, in the Hudson street dummies was instanced. Such explosions were quite common with an engineer, and when his doors were blown open he only got up and shut them again.

Dr. Van der Weyde, in reply to questions in regard to explosive mixtures of gas and air, said that the suggestion was a valuable one. Facts in abundance could be cited where similar explosions had occurred. He gave some details of an explosion in a flue, about 10 years ago, in the Bessemer works at Troy, which did no little damage. The doctor was present at the time and made an investigation of the facts. The explosive character of combustible gases was mentioned, and examples of explosions of empty petroleum barrels, where air had been mixed with the petroleum vapor, were given. In conclusion, he said it was plain how the pressure in the boiler would have gone up rapidly, if from a gas explosion the dampers had been blown open.

In reply to a question from Dr. Trimble, Dr. Van der Weyde said that the immense volume of steam and the great force of the explosion were easily accounted for. In round numbers, the head of the drum had an area of 800 square inches, being, say, 32 inches in diameter. Each pound of pressure in the boiler represented 800 pounds, forcing the head upward. With dampers and ash-

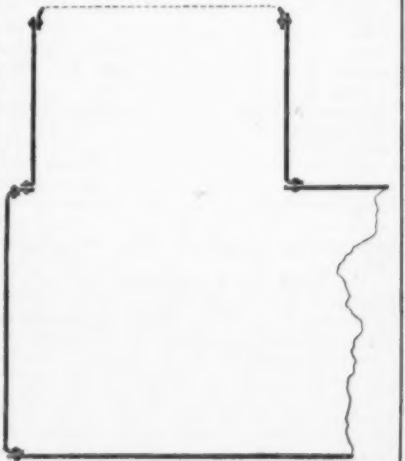


Fig. 3.—Size and Position of Dome on Boiler.

pit doors open, steam would be generated with great rapidity, and when 70 pounds were reached the total pressure would be no less than 56,000 pounds, or 28 tons—a force amply sufficient to have done all the damage that was noticed. Replying to Dr. Parmelee's question in regard to what the safety valve was doing at the time, he said that it was very likely stuck fast, or, more probably, was not large enough, as is commonly the case.

It was then stated that steam had been blowing off for some time previous to the explosion.

It is not necessary to adopt the theory given in Mr. Park Benjamin's letter to the *Herald*, in order to account for the explosion. Its fallacy was shown by the fact that the vaporization of a single pound of water would rob the boiler of 1000 units of heat, and so lower the temperature and reduce the pressure. The boiler gave way because the pressure was greater than its weakest part was able to bear, and that pressure had gone up gradually. An explosion of a carbonic acid gas receiver in France was instanced to show that steady pressure of an elastic gas was able to produce destructive explosions. The doctor then laughingly alluded to a plan to put the boilers outside of the ship at the stern as a safeguard. Then, if an explosion took place, neither passengers nor ship would be injured.

Dr. Trimble spoke of the great interest attaching to this case, because there are so many boilers under the street. There are in the city 4011 engines and boilers, 720 of which are insured, and more than half of the whole number are said by the Bureau of Boiler Inspectors to be under the sidewalks and streets. Heavy blocks of stone, bricks and weights amounting to more than 100 pounds were scattered by the explosion, thus indicating the great danger of placing boilers in this position.

Mr. Sutton: "Isn't this the safest place for a boiler?"

Dr. Van der Weyde answered "Yes," and instanced the great Hague street explosion years ago, when a whole building was wrecked by a large low-pressure boiler under it. Some hundreds of people were killed, burned or injured by the explosion and fire that followed.

Mr. Sutton said: "I defy you to kill more than ten people by an explosion under the sidewalk, yet hundreds might be destroyed with an explosion in a building. It is a vastly better place for them than under the building. We cannot have safety till we give men proper wages, so that we can have good capable men. You would have been surprised if you had asked this engineer's salary. A more intelligent man might have objected to running such a boiler had he known that it was 11 years old, and that expansion and contraction were doing their work. It had been tested by

water pressure, but," he remarked, very suggestively, "it was none the better for that."

The engineer should have known how to go over the boiler and test it with his light riveting hammer. Such testing can be done with a 3, or even a 2 ounce hammer.

The value of the hammer test in detecting flaws in iron was then discussed, and Mr. Sutton showed that small flaws in single rivets could be found by the hammer, and a light one at that. Engineers seem to neglect this, while on railroads the greatest attention is paid to this method of testing, and by it all car and engine wheels are examined. The immense quantity of steam which escaped caused a further discussion. It was shown that the volume from this boiler, when three-quarters full of water, would amount, at atmospheric pressure, to about 14,700 cubic feet. The other boiler added a great quantity to this, perhaps amounting to half as much more.

Dr. Vander Weyde took up the subject of the education of engineers in the use of the hammer for testing, explained how in medicine the most valuable information could be obtained from percussion of the different portions of the human body, and said it might be equally valuable to the engineer in obtaining a knowledge of the condition of metal &c. Engineers should be trained men.

"But, Doctor," said Mr. Sutton, "they get \$12 per week."

"Yes, sir, that is the trouble. They are not paid enough to know anything. There was the engineer of the exploded steamer Westfield, who did not know what a vacuum was."

Mr. Sutton, again interrupting, "Oh, yes, he did. It was something that 'smelled bad.'" Dr. Van der Weyde: "Yes, that is true, he did say so. Our engineers must be men of liberal education—that is, they must have some knowledge outside of that needed to open and shut the throttle and use the starting bar."

Here the Doctor replied to several questions in regard to the form of the boiler, which was not bad, although not of the strongest pattern. In the Hague street explosion, he said the large building was raised bodily in the air and dashed upon the ground. Fire completed what the explosion began. Here, had the boiler been under the street, the danger would have been slight and the loss of life small.

The president, Mr. Stetson: "Under the street is, without doubt, the safest place to put boilers in a large city. The ordinances direct that, when practicable, the boilers shall be placed under the sidewalks rather than within the buildings. The greatest safety is secured when the boilers are made from a series of small pipes, as in the Babcock & Wilcox, the Perkins, and other boilers of the tubular class. In case of a defect, instead of an explosion, a pipe merely opened and steam was blown off. The safety valve should be of such a character as to be able to relieve any under pressure, but, unfortunately, it is frequently much too small. The 'pop' valve, used upon locomotives, is particularly valuable, because it can be set to blow off at one pressure and remain wide open until the pressure has been reduced many pounds."

Mr. Partridge then spoke of the danger attending the use of boilers having large water spaces, and pointed out the fact that the most destructive explosions have always been of boilers containing large quantities of water, without regard to the pressure carried. The immense mass of water acted as a reservoir for heat, and if the pressure is suddenly reduced, a very great proportion of this heat may be transformed instantly into power, which is expended upon the shell of the boiler. Illustrations are found in the facts of most explosions of large boilers taking place just after starting of the engines. A number of instances were then cited.

Mr. Hudson here presented a report, illustrated with diagrams showing a plan for rearranging the seats in the Polytechnic room. By the proposed arrangement some 16 seats would be gained, while the aisles, transferred to the back of the room, would permit passing in and out without disturbing the speakers. The audience would also be much more comfortably disposed. Upon vote it was decided to take steps to carry out this very important improvement.

Prof. Van der Weyde's remarks on the telephone, and the discussion which followed, will be given next week.

The Connellsville Gas Coal Company own about 3100 acres of coal land in the Connellsville region, Pennsylvania. The company have recently sunk a shaft on their land and struck the coal at a depth of 304 feet. The vein is about 9½ feet thick, which is about 1½ feet thicker than the average throughout the region, and the coal is of remarkable purity, possessing the required properties for the manufacture of coke in a very high degree. An impartial analysis of this coal, recently made by Prof. Charles P. Williams of Philadelphia, gives: Fixed carbon, 64.18; coke, 70.30; ash, 6.12; and sulphur, 0.6. These figures are considerably in advance of the highest analysis hitherto known of Connellsville coal. The company expect, in the course of two months, to have their shaft lined and prepared for hoisting, 100 coke ovens built and their railroad connections completed, and hope to commence the manufacture of coke by April 1. There is some probability that they will erect 100 or 200 more ovens in the spring. The town of Trotter has been built by the company on their land, about 1½ miles from Connellsville. It consists of 84 tenement houses and one large store building, together with offices, machinery houses, &c. About 1000 acres of the company's land have been leased to the Cambria Iron Company, for the use of the 500 coke ovens which they are now operating.

The manufacturers of spiegeleisen in Siegen are becoming alarmed at the fact that American steel works are constantly increasing their demands as to the grade of the metal required by them. Few will take spiegeleisen running lower than 20 per cent. of manganese, which is, considerably above their average.

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#### To Ad Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co. of Detroit, for an infringement of my patent, was made and entered of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit, &c., on Wednesday, the 8th day of December, 1880.

NELSON LYON

GUYTON T. FISHER, et al.,

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jerome S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1879, and numbered 138,481, granted and issued to Joseph Barsaloux, Jeremiah S. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as directed by said act, was a good and valid patent.

That said Joseph Barsaloux was the original and first inventor of the improvements in metallic stiffeners for boots and shoe heels mentioned and described in said letters patent.

That the Released Letters Patent No. 9198, dated May 11, 1880, granted to said Nelson Lyon for an improvement in metallic heel stiffeners for boots and shoes, originally patented as aforesaid, is a good and valid patent; that said Lyon is exclusively possessed of said Letters Patent and the invention thereby secured.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patents and upon the exclusive rights of said Lyon under the same.

That said Lyon receive of said defendants all the profits, &c., they have made, and in addition thereto all the damage he has suffered by reason of the infringements by the defendants, and also the costs, charges and disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my patents must be addressed to and made with my attorney, WILLIAM H. KING, in my care, at the above address.

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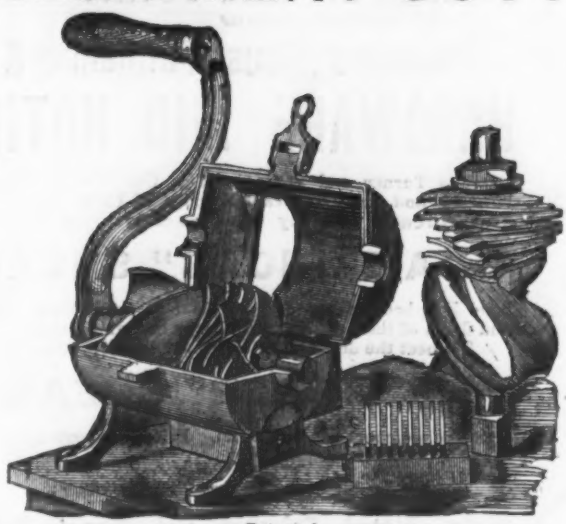
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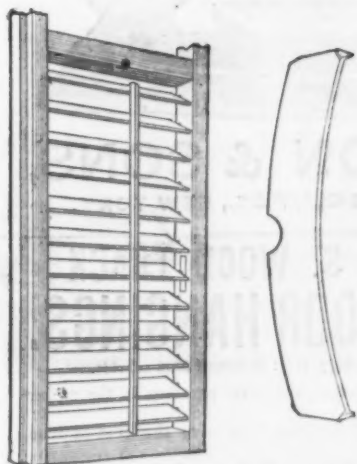
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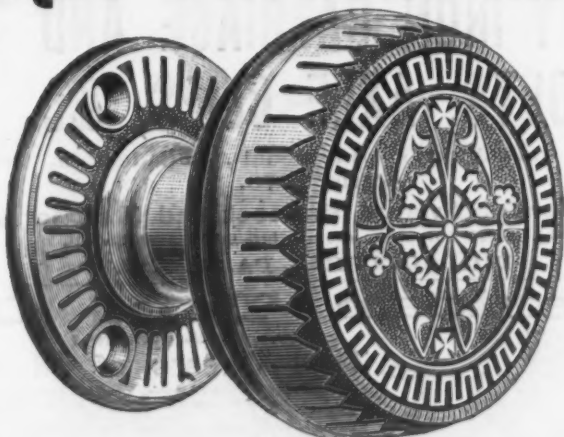
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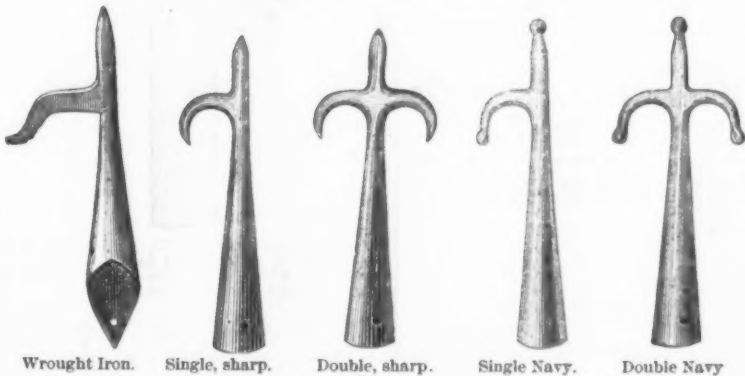
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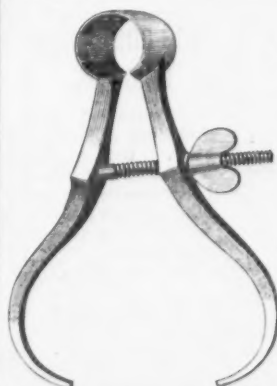
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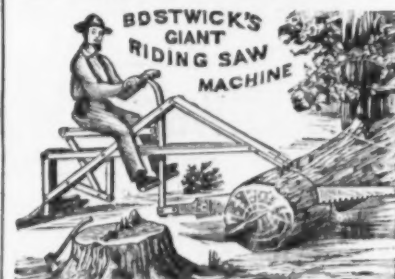
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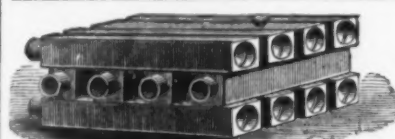
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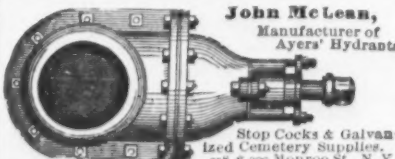
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### DOOR LOCKS AND HARDWARE,

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CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS, BARN DOOR HANGERS, & RAIL, CRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS, PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

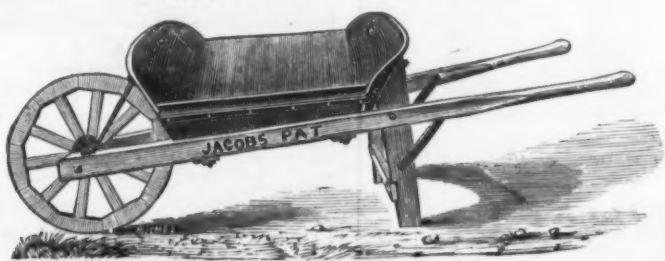
Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

Agencies. { James M. Vance & Co., No. 211 Market St., Philadelphia.  
James Marshall, No. 48 Warren St., New York.

### RAILROAD OR CANAL BARROW,

With Jacobs' Patent Wheel.



Full sized, bent tray, planed and well finished. Bolted securely to frame. The legs extend upward, serving as a brace to the bowl, to which they are bolted; they are also bolted to handles. This Barrow has the Jacobs Patent Wheel, superior in every way to any iron wheel manufactured. The wheel revolves on a fixed axle bolt, similar to a buggy wheel. The axle bolt holds the barrow firmly together. The barrow for Railroad Contractors. Will outwear any other made, and displaces all others wherever introduced. Wheel painted.

We also manufacture a full line of

ORE, BRICK, STONE and GARDEN BARROWS.

Also,

Road Scrapers, Road Plows, Levelers, &c.

### REVOLVING SCRAPER CO.,

COLUMBUS, - - - - - OHIO, U. S. A.

## The Edwards Manufacturing Co.

DETROIT, MICH.

SUCCESSORS TO THE

Union Spring Co.  
CLEVELAND, OHIO.

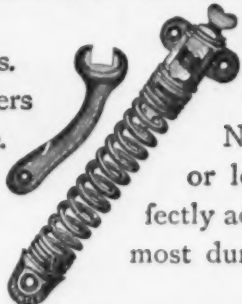
Union Spring Co.  
YPSILANTI, MICH.

SOLE MANUFACTURERS OF THE

### UNION DOOR AND GATE SPRINGS!

REVERSIBLE AND ADJUSTABLE.

A Pronounced Success. all mechanics and builders cheapest Spring made. or pins to be broken easiest and most per-somest, as well as the



Acknowledged by to be the best and No small castings or lost. The simplest, fectly adjusted. The hand-most durable Spring made.

We Manufacture them in Four Sizes, either Coppered or Japanned.

No. 9—For Screen and Light Doors.  
No. 7—For Large Doors and Gates.

No. 8—For Medium Weight Doors and Gates  
No. 6—For Store Doors and Extra Heavy Gates

CORRESPONDENCE SOLICITED.

## SIDNEY SHEPARD & CO.,

PROPRIETORS OF

### THE BUFFALO STAMPING WORKS.



### STAMPED & JAPANNED TIN WARE

Retinned Ware, Plain Piced Tin Ware, Bathing Apparatus, Toilet Ware, Tin Toys, Spoons, Fish Forks, Cake Turners, Coal and Fire Shovels, Pokers, Fry Pans, Store Skillets, Coal Hods, Coal Vases, Water Coolers and Filters, Harness Oil Cans, Soldering Coppers.

Dripping Pans, Elbows, Milk Cans and Fixtures, Roofing Nails, Stove Boards, Transportation Cans, Buffalo Champion Ice Cream Freezers.

PERFORATED SHEET IRON FOR PAPER MANUFACTURERS AND MALT KILNS.

Grocers', Druggists' and Spice Mills' Tin Ware a Specialty.

ALSO A LARGE LINE OF MISCELLANEOUS HOUSE FURNISHING HARDWARE.

Send for Illustrated Catalogue. Address

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or

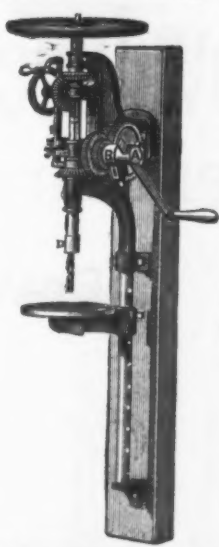
Chicago, Ill.

## GEORGE C. TAFT,

Worcester, Mass., U. S. A.,

Manufacturer of

Improved Upright and Horizontal Self-Feed Drills, For Blacksmiths' and Carriage Makers' Use.



Illustrated circulars giving descriptions of my several self drills, sent on application.

This cut represents my No. 2 Improved Drill, double geared, so arranged that by moving the crank from A to B it will give a slow motion for heavy drilling to the drill spindle.

The Oldest Shot Tower in America.

FOUNDED JULY 4, 1808.



## THOMAS W. SPARKS,

Manufacturer of

SPARKS'

American Chilled Shot.

Rivaling the English and all Others.

STANDARD DROP & BUCK SHOT AND BAR LEAD.

121 Walnut Street, Philadelphia.

## Bridgewater Iron Co.,

Bridgewater, Mass.,

Manufacturers of

SEAMLESS DRAWN COPPER AND BRASS TUBES,

TACK PLATES,

Forgings of every description.

Bridgewater Iron Co.'s

HORSE NAILS.

PRICE LIST.

No. 100 5 5 5 5 5 5 5 5 5 5

Per lb. 25¢ 25¢ 25¢ 25¢ 25¢ 25¢ 25¢ 25¢ 25¢ 25¢

Liberal discounts to the Trade.

73 Pearl Street, New York.

28 Broad Street, Boston.

## Tree and Hedge Trimmer.

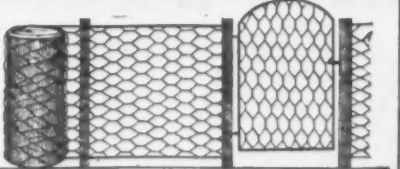
Unsurpassed for cheapness and durability. Unlike any other make, it combines a perfect lever principle with a blade working in a slotted steel hook. Send for circular.

E. S. LEE & CO.,  
164 West Main St., Rochester, N. Y.

## SEDGWICK BROS., Richmond, Ind.,

Manufacturers of

Steel Wire Network Fences & Gates



The only general purpose Wire Fence in use. Will turn dogs, pigs and poultry, as well as the most vicious stock, without danger of barbs. Cheap and durable. Just the Fence for Farms, Gardens, Stock Ranches and Railroads. Very desirable for Lawns, Parks and Cemeteries. It is covered with rust-proof paint, and will last a lifetime. Far better than barbed wire and better than boards in every respect. Wears into favor wherever used. The Sedgwick Gates, made of wrought iron pipe and steel wire, defy competition in neatness, lightness, strength and durability.

Liberal terms to agents and dealers.

LANBERSON'S

## PRICE BOOKS.

Full Leather, \$7.50. Half Leather, \$6.50. Pocket Edition, Full Leather, \$3.50.

DISCOUNT Bolt List, \$1.50.

Leigh's Discount Book, 50 cents.

Address all orders to Pope & Stevens, General Agents, 40 Chambers Street, N. Y.

For sale at publisher's prices by Wm. Blair & Co., Chicago; A. E. Shippleigh & Co., St. Louis; C. E. James, Detroit.

## THE TURNER & SEYMOUR MFG. CO.

WOLCOTTVILLE, CONN.,

MANUFACTURERS OF

Upholsterers', Stationers', House Furnishing & Fancy HARDWARE AND NOTIONS.

The Turner and Seymour Mfg. Co. have been longer in the business and make a greater variety of Cast Iron Scissors and Shears than any other concern in the world. Our

### "AMERICAN" SHEARS

have long been conceded to be the best ever made. The quality and finish of these goods shall always be maintained.

To meet the demand for a cheaper line we offer the trade our

### "CLIPPER" SHEARS.

On these we cannot be undersold. Price is about 25 per cent. less than the "American."

We are now making a fine line of cheap

Nickel Plated Scissors and Shears, Nut Picks, Nut Crackers, Fruit Knives &c.

Price Lists furnished on application.



## H. S. MANNING & CO.,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



111 Liberty Street, NEW YORK.

## MARKET SCALES,

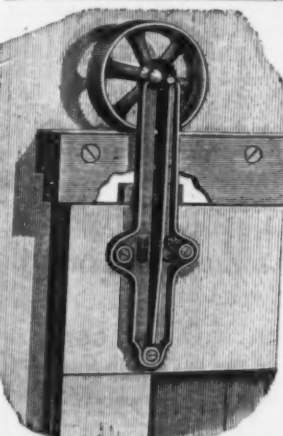
With Attachment for Taking the Tare.

Manufactured by

## JOHN CHATILLON & SONS,

Send for Illustrated Price List.

89, 91 & 93 CLIFF ST., NEW YORK.



## THE U. S. WOOD TRACK BARN DOOR HANGINGS.

Patented April 13, 1869; Reissued Jan. 11, 1881.

This patent covers all rail with a recess in the under side.

By using these Hangings you save the cost of iron rail.

They cannot be thrown off the track.

We also manufacture

Anti-Friction and Check-back Hangings, Rail, Stay Rollers, &c.

Send for price list.

MEDINA MANUFACTURING CO.,  
SAMSON & SWETT, Props., Medina, N. Y.

## Coleman Eagle Bolt Works

ESTABLISHED 1845.

## WELSH & LEA.

## NORWAY IRON CARRIAGE AND TIRE BOLTS, AXLE CLIPS, &c.

Highest and only Awards and Medals, Philadelphia, 1876, and Paris, 1878.

Works, Columbia Avenue, Hancock and Mascher Streets,  
Office, 145 Columbia Avenue (late 2030 Arch Street),  
PHILADELPHIA, PA., U. S. A.

## American Tool Co.,

Manufacturers of



Tool Chests of all Sizes.

Adapted for the use of Boys, Youths, Gentlemen, Farmers, Planters, Carpenters and Railroads, fitted up complete with a superior quality of Tools, and suited to the wants of the Hardware, Toy, Notion and Variety trades. Illustrated descriptive catalogue furnished on application. Export trade solicited, and a full stock of large-sized chests always on hand. Quality considered, we think our goods will be admitted by buyers the cheapest that have yet been offered by any manufacturer in the United States or Europe.

MECHANICS' TOOLS AND HARDWARE SPECIALTIES.

Warehouse and Salesroom, 116 Chambers St., New York, U. S. A.

## HANDLES FOR MANUFACTURERS.

From Selected Stock, Thoroughly Seasoned, Well Made.

Orders solicited from close buyers who want good work.

## RIPLEY MANUFACTURING CO.,

Unionville, Conn.,

Manufacturers of

Common Mouse Traps, Porcelain-Lined Lemon Squeezers and House Furnishing Ware.



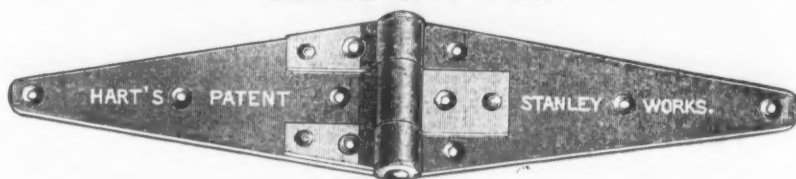
# THE STANLEY WORKS,

## NEW BRITAIN, CONN.,

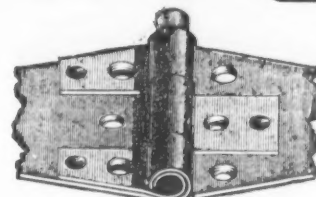
Hereby announce to the trade that they have added to their line of STRAP AND T HINGES the following patented goods, of which they have a complete stock.

### Hart's Patent Hinge.

CLASS NO. 929.



No. 1.



No. 2.

Cut No. 1 represents Hart's Patent Heavy Strap Hinge; No. 2, end view of Hinge with pin partly driven out, in order to show the two thicknesses of iron which form the joint. It will be noticed that the two thicknesses of iron referred to surround the pin throughout its length and extend back upon the straps of the Hinge, thus giving double thickness of iron at the points where most needed, and more than double the strength of an ordinary strap hinge. The short or inside leaves are galvanized, thus insuring easy working joints and preventing breakage on account of rust.

The screws or bolts for securing these hinges to the post and door pass through both plates of iron, and thus give great strength and firmness to the Hinge in addition to that imparted by the double thickness of iron.

These Hinges are of about the same weight as Stanley's regular Heavy Strap, and have a list price per dozen instead of by the pound, thereby avoiding trouble of weighing.

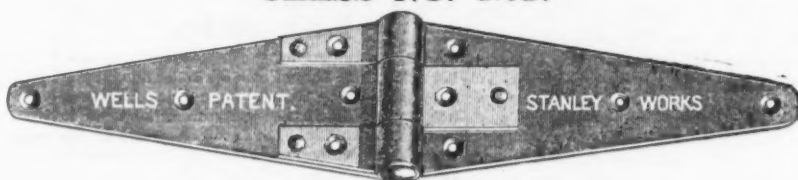
Sizes,	5	6	8	10	12	14 Inch.
Price per dozen pairs,	\$2.00	2.80	4.40	6.60	9.40	12.00

PLEASE USE CLASS NUMBER IN ORDERING.

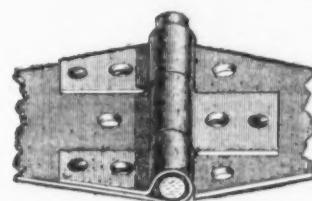
A Line of Light Strap Hinges similar to above are in process of manufacture.

### Wells' Patent Hinge.

CLASS NO. 925.



No. 1.



No. 2.

Cut No. 1 represents Wells' Patent Heavy Strap Hinge; No. 2, an end view of same (pin not riveted) showing the end of strap formed around the pin and extending beyond the joint.

It will be seen from the cuts that the iron which forms the prongs of the hinge joint is lengthened and extended beyond the joint upon the straps of the Hinge, thus giving a double thickness of iron at those points which are weakest in the ordinary hinge, making the 6 in. Patent Hinge stronger than the ordinary 8 in.; the 8 in. stronger than the ordinary 10 in., and so on for other sizes.

The screws or bolts for securing these Hinges to the post and door pass through both plates of iron, and thus give great strength and firmness to the Hinge, in addition to that imparted by the double thickness.

Sizes,	5	6	8	10	12	14 Inch.
Per dozen pairs,	\$2.00	2.80	4.40	6.60	9.40	12.00

No. 927 Represents WELLS' PATENT EXTRA HEAVY T HINGE, with Straps made on the above plan.



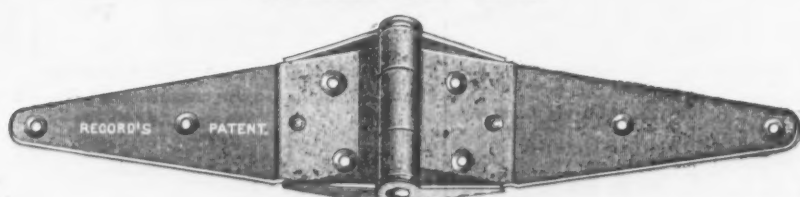
Class No. 927.

Sizes,	6	8	10	12	14 Inch.
Per dozen pairs,	\$3.30	5.15	7.40	10.90	12.00

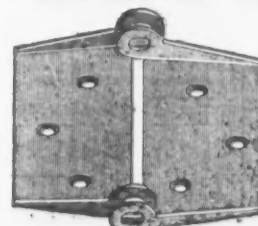
PLEASE USE CLASS NUMBER IN ORDERING.

### Record's Patent Hinge.

CLASS NO. 999.



No. 1.



No. 2.

Cut No. 1 represents Record's Patent Heavy Strap Hinge; No. 2, the supports with flanges showing holes for pintle.

The main part of this Hinge is of the same width and about the same thickness as the ordinary heavy strap.

The joint is strengthened by supports made of extra quality of iron, firmly riveted to the back of the Hinge and having side ears, through which the pintle of the Hinge passes, thus especially supporting the one prong or weak part of the Hinge and adding greatly to its strength; also, by the additional thickness of iron, greatly stiffening the Hinge where most liable to bend.

As the straps of the Hinge are bent down, forming an offset for the reception of the supports, the Hinge is smooth or flat on the back, same as the ordinary strap hinge. These Hinges can be applied wherever the ordinary hinge can be used.

Sizes,	5	6	8	10	12 Inch.
Per dozen pairs,	\$2.90	3.60	5.90	7.50	10.50

PLEASE USE CLASS NUMBER IN ORDERING.

SAMPLES OF ABOVE PATENT HINGES FURNISHED ON APPLICATION.

A large and well-assorted stock of Wrought Butts, Door Bolts, Washers, &c., now on hand.

Factories, New Britain, Conn.

Warehouse, 79 Chambers St., New York.



# Trade Report.

Office of THE IRON AGE,  
WEDNESDAY EVENING, January 26, 1881.

During the past week the financial markets have been active. The leading drawers of sterling exchange advanced their rates, which were subsequently reduced in part, making the closing quotation 98 3/4 and 99 1/4 for sixty-day and demand bills respectively. The ruling rates to borrowers on call have been 5 @ 6%, but loans were made as low as 3%.

The importations of specie and bullion at this port during the week ending January 21, were \$2,665,341, consisting of \$2,576,165, in gold and \$143,952 in silver, as against a total of \$205,951 for the week ending January 24 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1, 1880.	1881.
Gold.....	\$3,816,064	\$530,692
Silver.....	\$431,759	\$169,304
Total.....	\$4,247,823	\$699,996
	Since August 1, 1880.	1881.
Gold.....	\$70,935,953	\$75,558,664
Silver.....	\$2,605,469	\$3,146,858
Total.....	\$73,541,422	\$78,705,522

Early in the week United States bonds were strong, but later the 4s and 4 1/2s declined 1/4. State bonds were quiet and steady. Railroad bonds irregular, but in the main strong, and prices advanced 1/4 @ 1/2%. We give below the closing quotations of governments.

The general stock market was alternately strong and heavy until near the close on Monday, when prices showed an advance of 1/4 @ 1/2%. On Tuesday the market fell off 1/4 @ 1/2%. The principal dealings were in Erie, Northwest, Milwaukee and St. Paul, Western Union, Pacific Mail, Wabash, and the coal stocks. We give below the closing quotations of active stocks.

The bank statement makes the following comparison of aggregate averages for the past two weeks:

	January 15, 1881.	January 22, 1881.	Comparison.
Loans.....	\$304,864,300	\$307,830,600	Inc. \$2,966,300
Specie.....	64,669,500	66,484,100	Inc. 1,814,600
Legal t'ns.....	16,986,000	16,986,000	Inc. 0
Reserve.....	81,468,600	82,879,700	Inc. 1,411,100
Deposits.....	294,376,800	298,931,900	Inc. 4,555,100
Reserve re- quired.....	73,094,900	74,739,075	Inc. 1,644,175
Surplus.....	3,054,400	8,146,725	Inc. 5,092,325
Circulation.....	18,425,000	18,345,500	Dec. 79,500

For the week ended January 22:

	1879.	1880.	1881.
Total for week.....	\$4,051,401	\$11,068,634	\$6,225,432
Prev. reported.....	\$4,460,314	\$13,000,325	\$6,287,536

Since Jan. 1..... \$11,447,715 \$24,068,959 \$22,512,968

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Anvils.....	352	\$4,015
Brass goods.....	18	2,117
Bronzes.....	2	27
Chains and anchors.....	57	1,375
Copper.....	44	2,109
Cutlery.....	95	23,160
Flax.....	5	340
Gas fixtures.....	1	732
Guns.....	73	14,399
Hardware.....	44	2,109
Iron, pig, tons.....	5,124	101,286
Iron, sheet, tons.....	31	1,303
Iron ore, tons.....	3,514	12,390
Iron, other, tons.....	197	22,557
Metal goods.....	197	22,557
Nails.....	6	933
Nickels.....	18	6,292
Old metal.....	8	3,430
Platina.....	3	14,637
Plated ware.....	3	677
Saddlery.....	4	624
Steel.....	14,023	66,120
Silverware.....	8	352
Tin, boxes.....	28,690	110,233
Tin, 1/2 slabs; 156,695 lbs.....	32,462	32,462
Wire.....	3	3,68
Zinc.....	68,875	2,574

EXPORTS, EXCLUSIVE OF SPECIE.

	1879.	1880.	1881.
For the week.....	\$5,050,349	\$6,744,879	\$7,104,084
Prev. reported.....	\$5,050,349	\$6,744,879	\$7,104,084

Since Jan. 1..... \$14,637,304 \$17,430,959 \$20,390,881

EXPORTS OF SPECIE.

	1879.	1880.	1881.
For the week.....	\$1,460,349	\$1,460,349	\$1,460,349
Previously reported.....	\$1,460,349	\$1,460,349	\$1,460,349

For week ended January 22:

	1879.	1880.	1881.
Total since January 1, 1881.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1879.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1880.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1877.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1876.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1875.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1874.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1873.....	\$1,460,349	\$1,460,349	\$1,460,349
Same time in 1872.....	\$1,460,349	\$1,460,349	\$1,460,349

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. 6's 1881 registered.....	101 1/2	101 3/4
U. S. 6's 1881 coupon.....	101 1/2	101 3/4
U. S. 5's 1881 registered.....	101 1/2	101 3/4
U. S. 5's 1881 coupon.....	101 1/2	101 3/4
U. S. 4's 1881 registered.....	101 1/2	101 3/4
U. S. 4's 1881 coupon.....	101 1/2	101 3/4
U. S. 4's 1880 registered.....	101 1/2	101 3/4
U. S. 4's 1880 coupon.....	101 1/2	101 3/4
U. S. Currency 6s 1895.....	101 1/2	101 3/4
U. S. Currency 6s 1890.....	101 1/2	101 3/4
U. S. Currency 6s 1885.....	101 1/2	101 3/4
U. S. Currency 6s 1880.....	101 1/2	101 3/4

The following were the closing quotations of active shares:

	Bid.	Asked.
American District Telegraph.....	6 1/4	6 1/2
Atlantic and Pacific Telegraph.....	47	48
Alton and Terre Haute.....	43	44
American Union Telegraph.....	82	83
Arizona.....	43	44
Burlington and Quincy.....	172	173
Canada Southern.....	80	81
C. C. & I. C.....	23 1/2	24
Central Pacific.....	91 1/2	92
Chic. St. Louis and New Orleans.....	35	36
Chesapeake and Ohio.....	23 1/2	24
1st Pref.....	34 1/2	35
2d Pref.....	25	26
Colorado Coal and Iron.....	39	40
Rock and Den Mines.....	50	51
1st Pref.....	50	51
Kansas and Texas.....	46	47
Louisville and Nashville.....	87 1/2	88
Lake Shore.....	131 1/2	132

Little Pittsburgh.....	2 1/2	3
Louisville, New Albany and Chic.....	76	77
Morris and Essex.....	122 1/2	123 1/2
Michigan Central.....	107 1/2	108 1/2
Metropolitan Elevated.....	35 1/2	36 1/2
Manhattan Elevated.....	12 1/2	13 1/2
Marietta and Cincinnati Pref.....	12 1/2	13 1/2
Mobile and Ohio.....	23 1/2	24 1/2
New Jersey Central.....	92 1/2	93 1/2
Northwest.....	131	132
New York Central.....	151 1/2	152 1/2
New York Elevated.....	124 1/2	125 1/2
Northern Pacific.....	33 1/2	34 1/2
Nash and Chattanooga.....	67	68
New Central Coal.....	28	29
Omaha.....	40 1/2	41 1/2
Ohio and Mississippi.....	107 1/2	108 1/2
Ohio Central.....	32 1/2	33 1/2
Ontario and Western.....	38 1/2	39 1/2
Ontario Silver.....	33 1/2	34 1/2
Oregon Navigation.....	144	145
Peoria, Decatur & Evansville.....	38 1/2	39 1/2
Pacific Mail.....	53 1/2	54 1/2
Panama.....	12	13
Quicksilver.....	12	13
Rome, Watertown & Og.....	37	38
Reading.....	61 1/2	62 1/2
Rock Island.....	138	139
St. Paul.....	110 1/2	111 1/2
St. Louis and San Francisco.....	46 1/2	47 1/2
St. Paul and Minn.....	101 1/2	102 1/2
St. Paul and Northern P. Co.....	101 1/2	102 1/2
Texas Pacific.....	43 1/2	44 1/2
Union Pacific.....	18 1/2	19 1/2
Wabash.....	48 1/2	49 1/2
Western Union Telegraph.....	115 1/2	116 1/2
Standard.....	23	24
Stromont.....	23	24
Sutro Tunnel.....	13	14
Delaware and Hudson Canal.....	107 1/2	108 1/2
Delaware, Lack. and Western.....	121 1/2	122 1/2
Denver and Rio Grande.....	9 1/2	10 1/2
Express-Adams.....	130	131
Wells, Fargo.....	120	121
United States.....	56 1/2	57 1/2
American.....	55 1/2	56 1/2
Erie and Western.....	55 1/2	56 1/2
Erie.....	55 1/2	56 1/2
Hannibal and St. Joseph.....	55 1/2	56 1/2
Houston and Texas.....	60	61
Iron Mountain.....	61 1/2	62 1/2
Illinois Central.....	131 1/2	132 1/2
Indiana, Bloom. and Western.....	68	69

MINING STOCKS.

The mining exchanges are very active to-day and transactions are large, but prices show no material change from yesterday.

Closing quotations.

	Bid.	Asked.
Amie.....	48	49
Alta Mont.....	1.85	1.90
American Flag.....	23	24
Bell Isle.....	60	61
Bechtel.....	85	86
Bonanza C.....	30	31
Buckeye.....	24	25
Bull Dog.....	3.60	3.65
Bulwer.....	1.70	1.80
Bodie.....	5.75	6.00
Boulder.....	60	61
Calaveras.....	20	21
Cale. B. H.....	15	16
California.....	1.25	1.35
Climax.....	49	50
Consolidated Virginia.....	2.05	2.10
Consolidated Imperial.....	1.00	1.05
Consolidated Pacific.....	1.00	1.05
Chrysolite.....	0.75	0.80
Cherokee.....	1.90	1.95
Dahlgren.....	1.40	1.45
Dunkin.....	1.40	1.45
Eureka C.....	20.50	21.00
Findley.....	27	28
Gold Place.....	47	48
Green Mountain.....	6.00	6.10
Hukill.....	1.45	1.50
Horn Silver.....	12 1/2	13 1/2
Independence.....	40	41
Lacrosse.....	28	29
Lucerne.....	10	11
L. Chief.....	1.10	1.15
Mariposa.....	1.05	1.10
Moore.....	1.80	1.85
Maybelle.....	1.90	1.95
Navajo.....	24	25
N. Y. & C.....	2.40	2.45
North Star.....	50	51
Red Elephant.....	20	21
Rappah.....	14	15
S. B. die.....	27	28
S. Hite.....	55	56
S. Bulwer.....	47	48
Silver Cliff.....	4.30	4.35

GENERAL HARDWARE.

Business is fair, and would doubtless be more active but for the continued embargo on transportation, due to the quantity of ice in our streets and rivers. The orders received from travelers are said to be numerous and satisfactory, considering the season, and the outlook for spring trade is very encouraging.

The demand for foreign Hardware is said to be light, but it is too early in the season to expect much activity. Prices are firm and unchanged.

The Nail market is very quiet at present, and we do not hear of any large orders being placed. We quote rod to 60d, \$2 90 @ \$3, net, according to quantity.

We received by telegraph, from our Chicago office to-day, some particulars regarding the licenses being issued by the Washburn & Moen Manufacturing Company, to manufacture Barbed Fence Wire under the patents owned by them, which will be found in our Chicago correspondence in another column.

The File manufacturers held a meeting at the St. Nicholas Hotel, in this city, on the 20th instant, at which the following establishments were represented: Western File Co., Nicholson File Co., Henry Diston & Sons File Co. (Limited), New American File Co., Madden & Cockayne File Co., Heller & Bros., Clarke & Draper, G. & H. Barnett and the Hiscoc File Mfg. Co.

An association was formed under the style of File Manufacturers' Union Association, and the following officers were elected: Hon. E. M. Madden, president; James M. Fessenden, vice president; Oscar N. Kyle, secretary and treasurer, and Samuel Diston, Wm. T. Nicholson and Oscar N. Kyle, executive committee. Committees for the revision of price lists and standard sizes for File Steel were appointed to report at a future meeting, to be called at an early day. No definite action regarding prices was arrived at, and in the unsettled condition of the business we have omitted the quotations of the makers named above in our table of "New York Wholesale Prices" on another page.

The manufacturers of Clothes Wringers

held a meeting in this city to-day and adjourned to meet again to-morrow. Prices of these goods are unsettled and irregular.

The meeting of manufacturers of Strap and T Hinges, mention of which appeared in our last issue, adjourned without taking any action in regard to price; the goods are quoted in this market at discount 60 and 10 per cent.

The manufacturers of Wrought Butts held a meeting on the 21st instant, when the following revised discounts were adopted, to take effect from date.

WROUGHT BUTTS.	Dis. per cent.
Loose Pin.....	55 to 60
Loose Joint.....	55 to 60
Narrow.....	55 to 60
Light Blind.....	55 to 60
Table.....	55 to 60
Back Flaps.....	55 to 60
Inside Blind.....	55 to 60
Broad F. J.....	55 to 60
Chest Hinges.....	55 to 60

We have received the following circular: SPRINGFIELD, MASS., January 24, 1881. P. O. Address, Brightwood.

To the Trade: The Genuine Stebbins Molasses Gates can now be purchased direct of the manufacturers, and we shall not be undersold. Our prices are guaranteed. Very respectfully,  
E. STEBBINS MFG. CO.

PHILADELPHIA, January 10, 1881. NEW YORK, January 10, 1881.

To the Hardware Trade.—The new illustrated price list of the Pennsylvania Lawn Mower will be ready for distribution January 24th, with reduced list prices for 1881. The discount on the reduced list to the Hardware Trade will be 30 per cent. Lawn Mowers shipped during the month of February and March will date from April 1st. Soliciting your orders, we are yours truly,  
LLOYD, SUPPLEE & WALTON, Philadelphia.

DURRIE & McCARTY, New York.

Notice is hereby given that the partnership heretofore existing between the undersigned, under the firm name of A. H. McNeal & Bro., is dissolved by mutual consent. The unsettled business of the firm will be adjusted by A. H. McNeal, who will continue the business. A. H. MCNEAL, W. E. MCNEAL.

Burlington, N. J., Jan. 10, 1881.

Johnson & Bro., File manufacturers, Newark, N. J., have issued a card to the trade, under date of the 20th instant, in which they say: "This a. m. our works was destroyed by fire, excepting our Grinding and Forging Department, which remains intact; this will enable us to fill orders, without any delay. We shall enlarge our Cutting Department, which will enable us to fill orders more promptly."

The Stanley Works, New Britain, Conn., and No. 79 Chambers street, New York, illustrate, in their advertisement on page 19, some new lines of Patent Strap and T-Hinges which they have recently added to their assortment. These Hinges will commend themselves to the trade, as it will be seen at a glance that they are strongest in those parts that in the common Hinge first yield to the strain of wear.

Sargent & Co., New York, and New Haven, Conn., have issued, under date of the 19th instant, discount sheet No. 2, to apply to their catalogue of 1880, to which is added a condensed price list of Mallory, Wheeler & Co.'s Locks, Knobs, &c.

Samson & Swett, proprietors Medina Mfg. Co., Medina, N. Y., invite the attention of the trade to the U. S. Wood Track Barn Door Hangings manufactured by them. The goods are illustrated in their advertisement on the 18th page, to which we invite attention. They are offered to the trade at discount 60 per cent. from the following list:

No. 4 in. Wheel, per dozen pairs.....\$12.00

No. 5 in. Wheel, per dozen pairs.....15.00

Henry Seymour Cutlery Co., Holyoke, Mass., and Nos. 84 and 86 Chambers street, New York, have issued their 1881 catalogue and price list, in which they show a good assortment of Tailors' Shears, Straight and Bent Trimmers, Pocket and Ladies' Scissors, Tailors' Points, Pruning Shears, Tinners' Snips and Solid Cast Steel Sheep Shears. In an advertisement on the tenth page they illustrate their "Diamond Edge Solid Cast Steel Sheep Shears," for which they claim great superiority, and to which we invite attention.

At the annual meeting of the stockholders of the Saranac Horse Nail Company, Plattsburgh, N. Y., held January 22, 1881, the following directors were elected for the ensuing year: S. P. Bowen, Herman Veeder, J. M. Weyer, J. H. Signor, Joseph Payette. The officers elected for the ensuing year are S. P. Bowen, president and treasurer; Herman Veeder, vice-president; W. S. Guibord, secretary.

The firm of Coulter, Flagler & Co. has been dissolved, and is succeeded by a new firm under the style of Flagler, Forsyth & Bradley, who will continue the business of Hardware Manufacturers' Agents, at the old stand, Nos. 87 Chambers and 69 Reade streets.

The manufacturers of Tinware have formed an association on the pooling plan, and have adopted the January, 1880, price list, with some additions of new goods. This list, which we print below, is subject to discount 50 per cent., in a small way, and to the large trade a discount of 50 and 10 per cent. is allowed. The following is a list of the members of the association:

LALANCE & GROSJEAN MFG. CO., UNITED STATES STAMPING CO., JAMES, ALKMAN & CO., E. KETCHAM & CO.,

ST. LOUIS STAMPING CO., F. HABERMAN, SIDNEY SHEPARD & CO., DOVER STAMPING CO., ADAMS & WESTLAKE MFG. CO., BARON MFG. CO., IRON CLAD MFG. CO., STANDARD TIN WARE CO., WILLIAM VOGEL, C. B. PORTER & CO., KEEN & HAGERTY, GEORGE BOOTH & CO., BENHAM & STOUTENBOROUGH, MATTHAI, INGRAM & CO., J. HALL ROHRMAN & SON.

Manual List, January 10, 1880, as Corrected January, 1881.

DEEP STAMPED WARE.

Biscuit Pans, Retained.

Inch.....	11 1/2	11 1/4	11 1/8	11	10 3/4
Per gross.....	\$12.38	13.05	13.50	14.25	15.30
Inch.....	12 1/2	12 1/4	12 1/8	12	11 3/4
Per gross.....	\$15.75	16.35	17.00	17.60	18.25

Pot Covers, Hemmed and Ringed.					
Inch.....	7 1/2	7 1/4	7 1/8	7	6 3/4
Per gross.....	\$8.63	9.10	9.53	9.98	10.43
Inch.....	8 1/2	8 1/4	8 1/8	8	7 3/4
Per gross.....	10.88	11.25	11.78	12.00	12.45
Inch.....	10	10 1/2	10 1/4	10 1/8	10 1/2
Per gross.....	12.90	13.50	13.80	14.25	14.93
Inch.....	11 1/2	11 1/4	11 1/8	11	10 3/4
Per gross.....	15.38	16.05	16.50	17.25	18.10
Inch.....	12 1/2	12 1/4	12 1/8	12	11 3/4
Per gross.....	18.75	19.35	20.00	21.00	22.25

Pie, Dinner or Scalloped Plates.					
Inch.....	6	7	8	9	10
Per gross.....	\$4.50	5.10	5.85	6.90	10.00
Inch.....	6 1/2	7 1/2	8 1/2	9 1/2	10 1/2
Per gross.....	5.10	5.85	6.90	8.10	10.00
Inch.....	8 1/2	9 1/2	10 1/2	11 1/2	12 1/2
Per gross.....	6.90	7.20	8.10	9.00	10.00

Pie Plates, Deep.					
Inch.....	9	10	11	12	13
Per gross.....	\$7.50	8.48	11.25	13.38	15.23
Inch.....	10	11	12	13	14
Per gross.....	10.45	11.25	13.38	15.23	17.75
Inch.....	11	12	13	14	15
Per gross.....	11.50	12.38	15.23	17.75	20.00

Mountain Cake Pans.					
Inch.....	8	9	10	11	12
Per gross.....	\$11.50	12.38	15.23	17.75	20.00
Inch.....	9	10	11	12	13
Per gross.....	12.38	13.38	15.23	17.75	20.00

Coffee Pot Covers.					
Plain.....	1 1/2	2	3	4	5
Inch.....	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2
Per gross.....	\$1.58	1.80	2.35	3.00	3.60
Rimmed.....	2 1/2	3 1/2	4 1/2	5 1/2	6 1/2
Per gross.....	\$2.63	3.35	4.13	4.73	5.38

T. K. Breads, with Plain Covers.					
Inch.....	7 1/2	8 1/2	9 1/2	10 1/2	11 1/2
Per gross.....	\$10.13	11.25	12.38	13.50	14.63
Inch.....	8 1/2	9 1/2	10 1/2	11 1/2	12 1/2
Per gross.....	11.25	12.38	13.50	14.63	15.75

T. K. Breads, with Rimmed Covers.					
Inch.....	7 1/2	8 1/2	9 1/2	10 1/2	11 1/2
Per gross.....	\$10.73	11.85	12.98	14.10	15.23
Inch.....	8 1/2	9 1/2	10 1/2	11 1/2	12 1/2
Per gross.....	11.85	12.98	14.10	15.23	16.35

Grater Plates.					
Sheet.....	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2
Per gross.....	\$3.15	3.63	4.13	4.73	5.38
Without Tubes, per gross.....	\$3.25	3.75	4.25	4.75	5.25
With Tubes.....	11.25	12.25	13.25	14.25	15.25

Stamped Square Pans.					
Sheet.....	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2
Per gross.....	\$3.15	3.63	4.13	4.73	5.38
Without Tubes, per gross.....	\$3.25	3.75	4.25	4.75	5.25
With Tubes.....	11.25	12.25	13.25	14.25	15.25

Steamer Bottoms.					
Add \$2.25 per gross to list of Pot Covers.					
Tin Stove Pot Rings.					
Inch.....	4	4 1/2	5	5 1/2	6
Per gross.....	\$4.50	5.10	5.85	6.90	8.10

Japan'd or Burnished.					
Inch.....	4	4 1/2	5	5 1/2	6
Per gross.....	\$4.50	5.10	5.85	6.90	8.10
Japan'd or Burnished.					
Inch.....	4	4 1/2	5	5 1/2	6
Per gross.....	\$4.50	5.10	5.85	6.90	8.10

Coffee Boiler Lips.					
To Rivet, Small, per gross.....	\$1.13	1.25	1.35	1.45	1.55
Large.....	1.25	1.35	1.45	1.55	1.65
To solder.....	1.35	1.45	1.55	1.65	1.75

Patty Pans.					
Inch.....	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2
Per gross.....	\$1.73	2.25	2.85	3.38	3.98
Scalloped, per gross.....	\$1.73	2.25	2.85	3.38	3.98

Deep Scalloped, per gross.....	\$1.80	2.10	2.40	2.70	3.00
Not.....	1.50	1.80	2.10	2.40	2.70
Oval, per gross.....	\$1.50	1.80	2.10	2.40	2.70
Star, Oblong, Heart, Shell.					
Per gross.....	\$2.10	2.40	2.70	3.00	3.30

Round Tea Pot Tops, with Covers, not Rimmed.					
Retained, per gross.....	\$2.00	2.25	2.50	2.75	3.00
Plain.....	2.00	2.25	2.50	2.75	3.00

Rimmed Boiler Covers.					
Inch.....	6	7	8	9	10
Per gross.....	\$2.40	3.00	3.75	4.73	5.75
Flat Edge Boiler Covers.					
Inch.....	6	7	8	9	10
Per gross.....	\$2.40	3.00	3.75	4.73	5.75

Funnel Tubes.					
Per gross.....	\$0.75	1.03	1.33	1.73	2.03

## BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]  
LONDON, Wednesday, January 26, 1881.

**Scotch Pig.**—There is very little demand, and, as a consequence, prices are weaker. We quote maker's prices:

Gartsherrie.....	61/8
Coltness.....	62
Glengarnock.....	59
Eglinton.....	54

**Manufactured Iron.**—There is no change to note, the market remaining quiet under a steady demand. Best Staffordshire Bars, £7 @ £7.10/.

**Steel Rails.**—Business has been fairly active during the week, with a tendency to higher prices. We quote: Ordinary Sections, £6.10/ @ £6.15/.

**Iron Rails.**—The market is quiet, with a fair business doing. Prices are firm. We quote Welsh, unchanged, £5 @ £5.10/.

**Old Rails.**—The heavy demand of the past two weeks has fallen off, and transactions have been lighter, with small offerings. We quote Old T. firm at £4.7/6.

**Scrap.**—The market is quiet, with fair business doing. The offerings are moderate. We quote Wrought firm at £3.10/.

## IRON.

**American Pig.**—There is little change to note in the condition of the Iron market this week. The sales reported have not been heavy, but we hear of an active inquiry, and the tone of the market is strong. We quote best Lehigh brands as follows: Foundry No. 1, \$25 @ \$26; Foundry No. 2, \$22 @ \$23; Gray Forge, \$20 @ \$21.

**Scotch Pig.**—Sales are reported since our last writing of 500 tons Scotch Pig, in lots, on terms that have not transpired, and 300 tons Gartsherrie, from yard, at \$24; terms, prompt cash. The business in foreign iron is retarded on account of the difficulties attend-

ing transportation, it being in many instances almost impossible to bring lighters alongside the piers, owing to the quantities of ice in the rivers, and cartage through our streets is difficult and dangerous in their present condition. Sales are reported of 1000 tons Middlesboro No. 3 Redcar at \$18.50, now held at \$19. We quote Eglinton, \$22 @ \$22.50; Carnbroe, \$22.50 @ \$23; Coltness, \$24.50 @ \$25; Glengarnock and Gartsherrie, \$23.50 @ \$24.

**Rails.**—We hear of considerable business in Steel Rails during the week, but were unable to learn full particulars. Of foreign a sale of 3000 tons English Steel on private terms is reported. In Iron Rails we do not hear of any new business, and quote, nominally, Iron, \$43 @ \$50, and Steel, at mill, \$59 @ \$62.50.

**Old Rails.**—Sales are reported of 1000 tons T. at \$28.75, and we hear rumors, which we were unable to confirm, of a large transaction in Double Heads. The demand is not as active as it was last week, and although there is no weakness apparent, the market lacks vim. We quote holders' views, \$29 @ \$31 for T. and D. H., respectively.

**Scrap.**—We quote Prime No. 1 Wrought, from yard, \$30 @ \$31.

## METALS.

**Copper.**—Has been firm, but with little doing, only 100,000 lb Lake Superior selling at 19 1/2¢ for the bulk of holdings, 19 1/2¢ is asked. Baltimore may be quoted at 18 1/2¢ @ 18 3/4¢. There is no change in the London market. From Valparaiso, by cable, the capture of Lima, the Peruvian capital, by the Chileans, under command of General Baquedano, is announced to have taken place on January 17, followed by the surrender of its port, Callao. We shall soon hear whether this event will put an end to the war. If it does, Copper production in Chili, which had declined some 10,000 tons last year, from an insufficiency of miners, may soon recover. The charters on the West Coast have been:

	1874.	1875.	1876.	1877.	1878.
Tons.....	50,000	48,000	48,000	48,000	48,000
China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

	1874.	1875.	1876.	1877.	1878.
Tons.....	50,000	48,000	48,000	48,000	48,000
China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

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Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

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England, &c.....	50,000	48,000	48,000	48,000	48,000

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China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

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England, &c.....	50,000	48,000	48,000	48,000	48,000

	1874.	1875.	1876.	1877.	1878.
Tons.....	50,000	48,000	48,000	48,000	48,000
China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

	1874.	1875.	1876.	1877.	1878.
Tons.....	50,000	48,000	48,000	48,000	48,000
China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

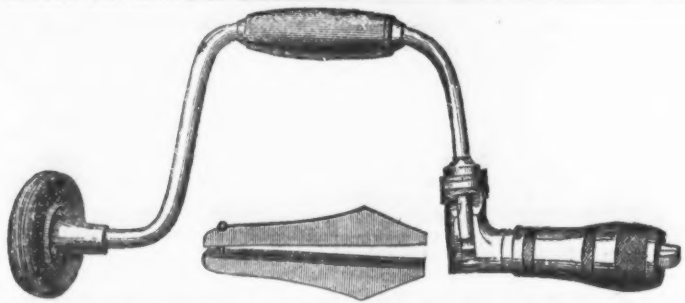
	1874.	1875.	1876.	1877.	1878.
Tons.....	50,000	48,000	48,000	48,000	48,000
China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
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China.....	50,000	48,000	48,000	48,000	48,000
Japan.....	50,000	48,000	48,000	48,000	48,000
Victoria.....	50,000	48,000	48,000	48,000	48,000
England, &c.....	50,000	48,000	48,000	48,000	48,000

the manufacture of Copper cement, which, with the ores mentioned above, have been purchased under contract by H. D. Ranlett, and shipped by him to the Baltimore Copper Works, for which he is the resident agent.

FOUNDRY IRONS.		
Hanging Rock Charcoal No. 1.....	\$27.00 @	30.00
" " No. 2.....	23.00 @	29.00
Coke and Stonecoal		
No. 1.....	25.00 @	26.00
Hanging Rock Coke and Stonecoal		
No. 2.....	25.00 @	25.00

the construction of the bridge the tower one supporting element, the framework of the floor the second and the extension system of stays the third. The floor, in section with the stays, will support itself out the assistance of the cables, so that if the cables were removed the bridge would only settle in the center, but it would not for the stays alone will support 15,000 tons, which is ample to hold up the floor. The first plan for the towers was 134 feet high at the water line, and 120 feet by 40 at the top, and the elevation was to have been



Though we have occupied this identical space in *The Iron Age* for more than twelve years, and though we have been the leading Bit Brace manufacturers of this country during all that time, we have seldom spoken of it in our advertisement, for the reason that all the leading dealers were supposed to know it. Since we first put

### THE BARBER IMPROVED BIT BRACE

on the market, at least a dozen patent braces have run their race through the stores and junk stores, and are now forgotten. It is true, some of them died violent deaths, but most of them perished from constitutional weakness. We do not offer to meet competition, as no one else can make our Brace, and we have nothing to compete with. Others might if they would make their braces of steel, but it is much more expensive, and no one can tell the difference until the brace is put into use. All of our Nickel-Plated Braces are made of rolled steel, with forged steel jaws, which will never wear out. We formerly made malleable iron jaws, which in time wore out. All such we will now replace with steel for 25 cents per pair. They are all one size and will always fit. Our Ratchet Brace at the present time has no competitor in the market. Dealers who sell other styles of braces will find it to their interest to buy their stock of ratchets from us.

The price of Barber Braces has not been changed for many years, and we do not anticipate any variation in the near future. Thanking our customers for past favors, we now solicit their future orders.

### MILLERS FALLS CO.,

74 Chambers Street, New York.

### HEATON & DENCKLA HARDWARE CO., Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.  
MALLORY, WHEELER & CO.'S Door and Pad Locks.

UNION MANUFACTURING CO.'S Butts.  
AMERICAN SCREW CO.'S Screws.  
D. R. BARTON TOOL CO.'S Edge Tools, &c.  
FRANCE'S Shutter Holders.  
Anti-Window Rattlers, Brass and Nickel-Plated.  
WESTERN FILE CO.'S Cast-Steel Files.  
AMERICAN SHEAR CO.'S Shears and Scissors.  
H. M. MYERS & CO.'S Shovels, Spades and Scoops.  
STEELE & SONS' Wrought Handle Sad Irons.

EXCELSIOR MILLS, Genuine Turkish Emery.  
BROWN & BRO.'S Brass and Copper Wire, Rivets, Spoons, &c.  
GAYLORD MANUFACTURING CO.'S Tilt, Chest and Cupboard Locks.

AMES' Genuine Chester Emery.

COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.  
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.  
AMERICAN MACHINE CO.'S Fluters, &c.  
STUART, PETERSON & CO.'S Tinned and Enamelled Ware, &c.  
HUSSEY, HOWE & CO.'S Bar & Sheet Cast Steel.

Also a large line of Heavy and Shelf Hardware.

### RHODE ISLAND HORSE SHOE CO.,

MANUFACTURERS OF

### Horse, Mule & Snow Shoes of the Perkins Pattern.

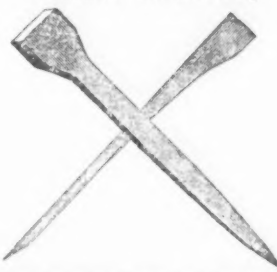
Works at Valley Falls, R. I., and Buffalo, N. Y. Office, 31 Exchange Place, Providence, R. I.  
W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary.

### NATIONAL Horse Nail Co.

MANUFACTURERS OF

### FINISHED

[BRIGHT OR BLUED]



These nails are made of the best brands of NORWAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,  
VERGENNES, VT.

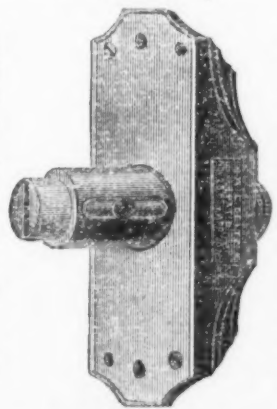
DURRIE & McCARTY, Agents,  
No. 97 Chambers St., New York

### A. E. DEITZ,

(Successor to Barnes & Deitz.)

Manufacturer of  
Store Door Locks, Night Latches, Padlocks, Drawer Locks,  
&c., with Flat Steel Keys.

EXTENSION TUBE



STORE DOOR LOCK, No. 184.

Durrie & McCarty, Agents,  
97 Chambers & 81 Reade Sts., New York.

### AXLES

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Wide Bar Full Length.

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REISSUED 1870.

NOVEMBER 10, 1863,  
FEBRUARY 23, 1864,  
REISSUED JUNE 1, 1869,  
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The *Field*, the country gentleman's newspaper of Great Britain, says: But the Pennsylvania Lawn Mower will recommend itself, both to the amateur and the professional, from the elimination of labor in driving it as compared with other machines, and also from the excellent manner in which its work is done, the hardest bends being removed as smoothly as the youngest grass. We find that a man can work the 18-inch machine as easily and as fast as the same man, aided readily be worked at a fast pace by a boy or moderately strong lady; and, indeed, one peculiarity of this machine is that it does fast work better than slow. We strongly recommend the "Pennsylvania" to our readers, as far as it is possible to form an opinion from a month's trial; but we may state that during that time it has been constantly used on three acres of grass.

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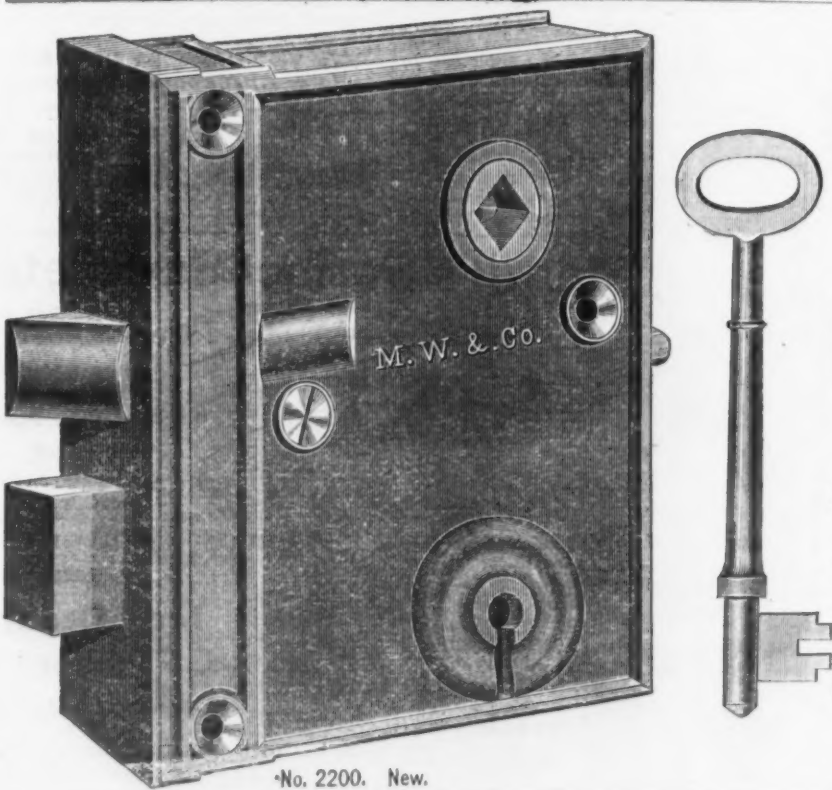
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Prices: Polished Tin, per doz., 2 pt., \$7.50; 5 pt., \$10.50; 7 pt., \$11.50; 9 pt., \$12.50. Nickel Silver, 2 pt., \$11.50; 5 pt., \$15.50; 7 pt., \$17.50; 9 pt., \$19.50. The nickel silver pots are nickel-plated outside and silver-plated inside. They are very handsome. Discount 25 per cent. Send for circular or 50 cents for a 5-pint sample pot.

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PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.  
Catalogues and samples sent upon application. BROOKLYN, N. Y.

118 feet above high water. Their dimensions have, however, been increased to 140 feet by 50 at the water line, and at the top 136 feet by 63, and the height of the center of the river span above high water is 135 feet. At the towers the height of the floor above high water is 110 feet 3 inches. The total height of the towers above high water is 278 feet, 150 feet of which is above the roadway. The depth of the tower foundation below high water on the Brooklyn side is 48 feet and on this side 78 feet. The anchorages are 120 feet by 110 at the base, and 117 feet by 104 at the top. The heights are 80 feet front and 85 feet rear.

In this first report Mr. Roebbling, looking to the future, says: "The time will arrive when substantial tunnels will be constructed, at an immense cost, under the bed of the river for the express purpose of transporting freight. Permanent tunnels of masonry are practicable, and can be made at a heavy cost. It will be done when money is worth 2½ per cent. and the population shall have increased tenfold." Mr. Roebbling also predicts an increase in the taxable property of Brooklyn, after the bridge shall have been completed, of from two to three millions annually, which, he says, will pay for the work in less than three years.

All these calculations and predictions were made on the 1st of September, 1867, nearly 14 years ago, and only about four months after the granting of the charter in which the following persons were named as incorporators: John T. Hoffnagel, Simon B. Chittenden, Edward Rugles, Smith Ely, Jr., Samuel Booth, Granville T. Jenks, Alexander McCue, Henry E. Pierpont, Martin Kalbfleisch, John Roach, Charles A. Townsend, Henry G. Stebbins, Charles E. Bell, Chauncey L. Mitchell, T. Bailey Myers, Seymour L. Husted, Wm. A. Fowler, Wm. W. Wood, Andrew H. Green, Edward W. Corlies, Wm. C. Rushmore, Echelbert S. Mills, Alfred W. Craven, Arthur W. Benson, T. B. Cornell, John N. Hayward, Isaac Van Anden, Pomory P. Dickinson, Alfred M. Wood, J. Carson Breckort, William Marshall, Samuel McLean, John W. Combs, William Hunter, Jr., John H. Prentice, Edmund Driggs, John P. Atkinson and John Morton. The capital stock of the corporation was fixed at \$5,000,000, in shares of \$100 each, with power to increase it with the consent of the majority of the stock. The persons above named were constituted the first board of directors, to hold their offices until the first Monday in June, 1868, and after that time it was provided that the number of directors should not be less than 13, nor more than 21. It was also directed that the officers should be a president, secretary and treasurer, to be annually elected by the board of directors.

It was provided in the act of incorporation that the cities of New York and Brooklyn might subscribe to the capital stock such amounts as two-thirds of their common councils respectively should determine, and that these cities, or either of them, might at any time take the bridge by paying 33½ per cent. more than the cost, and guaranteeing that it should be a free passageway for vehicles and travelers. The subscription books having been opened, the \$5,000,000 of stock was allotted as follows:

Purchaser.	Shares.	Paid Per cent.	Cash.
Henry C. Murphy.....	250	60	\$15,000
Isaac Van Anden.....	250	60	15,000
William Marshall.....	50	60	3,000
Seymour L. Husted.....	500	60	30,000
Samuel McLean.....	50	60	3,000
Arthur W. Benson.....	25	60	1,500
Alexander McCue.....	250	60	15,000
William M. Tweed.....	400	40	16,000
Peter B. Sweeney.....	400	40	16,000
Hugh Smith.....	400	40	16,000
R. B. Conolly.....	400	40	16,000
Henry W. Slocum.....	250	60	15,000
Jas. S. T. Stranahan.....	500	60	30,000
Kingsley & Keeney.....	300	60	18,000
John H. Prentice.....	100	60	6,000
Demas Barnes.....	100	60	6,000
John W. Lewis.....	50	60	3,000
William Hunter, Jr.....	50	40	2,000
Charles C. Martin.....	25	60	1,500
City of New York.....	15,000	60	9,000,000
City of Brooklyn.....	30,000	60	1,800,000
Totals.....	50,000	60	\$2,762,400

Mr. Roebbling entered heartily into the work, but before any actual construction was begun he met with an accident which cost him his life. He was engaged in making some measurements on the Brooklyn side, when one of the Fulton Ferry boats in entering her slip surged against the guard logs at its side. Mr. Roebbling was standing on the string-piece. His foot was caught and so badly crushed that it had afterward to be amputated, and he died from lock-jaw. Fortunately for the success of the enterprise, his son, Mr. W. A. Roebbling, had been associated with him in the work from the first, and was thoroughly conversant with all its details, so that he was able to succeed his father as Chief Engineer and carry on the construction as it had been originally planned. The work of construction was begun on Monday, January 3, 1870, and consisted at first of the removal of the piles of the upper slip, which had been used by the Fulton Ferry and which had been acquired by the bridge company. The borings on each side of the river indicated that to reach the bed-rock, on which alone a solid foundation for such immense weights as those of the proposed granite towers could be maintained, it would be necessary to go upon the Brooklyn side to a depth of 45 feet below high-water level and on this side to a depth of 75 feet. To make the necessary excavations it was determined to employ compressed air, and a contract was made with Messrs. Webb & Bell to build two wooden caissons larger than had ever been constructed before. The caisson used on the Brooklyn side, which was the first to be constructed, was 168 feet by 102 feet, and the other was 172 feet by 102 feet. Each was in effect a wooden box, bottom upward, the interior space in the New York caisson being 9 feet in height, with a roof of 22 feet thick of solid timber, bolted together. The caissons were built on ways, and launched as ships are launched, and then towed to the slips where the towers were to be erected. Caissons of granite were laid upon them, sinking them until they rested upon the bed of the river. Air was then forced into the chambers below until the water was displaced and the river-bed was left dry. The workmen then entered

the shafts, at the bottom of which were airlocks, and excavated the earth, which was carried to the surface and removed. The caissons thus settled, until in time, at the depths above named, the solid foundation was reached. Then the space where the workmen had operated was filled with concrete. It is expected that the timber thus buried so far below the surface will be practically indestructible, and that there is no danger of the towers settling. The pressure of air required in this work varied from 18 to 36 pounds. Of course there were many cases of "caisson disease" among the workmen, and this was the more frequent during the sinking of the Brooklyn caisson, which was the first to be placed in position; but experience was gained here, and during the sinking of the New York caisson the care of the workmen was placed under the supervision of Dr. Andrew H. Smith, who had made an especial study of this disease, so that the number of cases was reduced to a minimum. The sinking of the New York caisson was begun December 12, 1871, and the filling in with concrete was completed on July 20, 1872, a period of 221 days; the cases of illness occurring during that period being 86, of which 3 were fatal.

At this stage in the progress of the work it had become apparent that the cost of the structure was going to be much in excess of the original estimates, and rumors were current that in the expenditures thus far supplies had been furnished by members of the company at prices prejudicial to the interests of the bridge. The Executive Committee therefore directed the Chief Engineer, Mr. Roebbling, to examine and report whether the prices paid for stone, lumber and other materials and for labor had been reasonable and just, and in a report made on June 23, 1872, Mr. Roebbling reported that "every dollar's worth purchased for the bridge had been expended in a legitimate manner and for the purpose for which it was designed, and nothing whatever has to my knowledge been diverted into any outside channel." He also says: "It is a notorious fact that the stone for the East River Bridge is supplied at prices lower than any that have ruled for 12 years previous. In my opinion it has been furnished at the lowest living rates compatible with an adherence to the specifications. The same holds true in regard to the purchases of lumber, cement, gravel, iron, &c." Nevertheless, in the report of the Executive Committee for May, 1872, the actual expenditure to that time was stated at \$2,759,154.72, or within a small amount of all that had then been paid in. The Chief Engineer was instructed to report whether the bridge could be completed for the sum originally estimated by the first Chief Engineer or not, and if not, to state the causes of the excess. The final estimate of Mr. John A. Roebbling in 1867 was \$7,000,000. In reply to this instruction, Mr. W. A. Roebbling said that the bridge could not be completed for that amount; that the cost of the bridge as far as built comprised portions of the original estimate amounting to \$1,412,260; the actual cost, therefore, had exceeded the original estimate by \$1,346,894.72. The original estimates, he said, had omitted many large items entirely, and had taken others too low for want of sufficient information at the time. Then, too, since the original estimates were made, the bridge had been widened from 80 to 85 feet, two of the original sidewalks had been given up and two additional horse-car tracks substituted. These changes involved an increase of 7 per cent. in the cost of the entire bridge. Then the United States government had ordered an increase of 5 feet in the elevation of the bridge. No allowance whatever had been made for land and land damages. Again, in the original estimate provision had been made for a pile foundation for the towers, and the cost of excavating to the rock foundation had been largely in excess of the cost of a pile foundation. Then there had been a fire in the Brooklyn caisson which cost \$15,000, and in order to prevent a recurrence of such an accident, the interior of the New York caisson had been lined with boiler plate at an expense of \$20,000. He therefore submitted a new estimate, making the total cost \$9,500,000.

The fire in the Brooklyn caisson occurred early in 1872. Its exact cause was never fully known, but it was supposed that the workmen, discovering a leak in the caisson by the peculiar hissing noise which always gives warning of such leaks, had been going about with lighted candles to find its exact location, and had placed the flame near enough to some of the seams to ignite the oakum with which the joints of the caisson were caulked. As soon as the fire was discovered the air pressure was removed, and the interior of the caisson was allowed to fill with water. Work was suspended for four days, and then the pressure was renewed and the water again expelled. When the workmen again entered the chamber they found a considerable part of the timber on one side and part of the roof burned.

The work of building the towers was continued steadily during 1872 until the latter part of November, and it was resumed in the last week of March, 1873. By May of that year the New York tower had been raised 85 feet and the Brooklyn tower 162 feet. The land for the Brooklyn anchorage from York street to Front street along James street, had been acquired and excavated 25 feet for the foundation of that work. The Chief Engineer had become affected with the "caisson disease" and had been granted a four months' leave of absence. He therefore made no report for this year. Mr. William C. Kingsley, however, who had from the first been the general superintendent of the company, reported the progress of the work to the Executive Committee. It had been found impossible to purchase the property for the site of the Brooklyn anchorage from its owners by argument, and an application had to be made to the Supreme Court to appoint commissioners of appraisement. Silas Ludlam, William J. Osborne and Isaac Bideau were appointed, and upon their appraisement the land was taken, the price paid being about \$450,000. A further installment on the capital stock subscribed was called for and paid as follows:

Capital stock paid in as per statement of May 1, 1873.	
Henry C. Murphy.....	\$2,762,400
Isaac Van Anden.....	4,500
William Marshall.....	2,500
Seymour L. Husted.....	5,000
Arthur W. Benson.....	200
Alexander McCue.....	2,500
J. S. T. Stranahan.....	4,700
John H. Prentice.....	500
The City of New York.....	300,000
The City of Brooklyn.....	600,000
Demas Barnes.....	2,000
W. H. Vanderbilt.....	300
Abram S. Hewitt.....	100
W. A. Appleton.....	100
Lloyd Aspinwall.....	100
Total.....	\$3,684,600

The expenditures, however, kept pace with the receipts and amounted on the 1st of May, 1873, to \$3,573,196.40, necessitating another call upon the stockholders, who responded as follows:

1873.	
May 5, Wm. Marshall.....	\$500
June 17, John H. Prentice.....	1,000
June 17, A. W. Benson.....	400
June 17, J. S. T. Stranahan.....	2,500
June 17, J. S. T. Stranahan.....	4,800
June 17, Lloyd Aspinwall.....	100
June 17, A. S. Hewitt.....	100
June 17, Alexander McCue.....	1,500
June 17, Demas Barnes.....	2,000
June 19, Wm. Hunter, Jr.....	2,000
June 19, Kingsley & Keeney.....	17,400
June 19, C. C. Martin.....	400
June 19, Robert Bensch.....	200
June 19, C. P. Dixon.....	200
June 19, W. A. Fowler.....	200
June 19, W. W. Goodrich.....	200
June 19, F. D. Moulton.....	200
June 19, J. B. Norris.....	200
June 19, Wm. Schwarzwald.....	200
June 19, B. F. Tracy.....	200
June 19, J. B. Woodward.....	200
June 19, H. H. Wheeler.....	200
June 19, J. P. Robinson.....	200
June 20, Wm. Marshall.....	500
July 8, S. L. Husted.....	5,000
July 15, H. W. Slocum.....	5,000
Aug. 4, The City of Brooklyn.....	25,000
Aug. 4, The City of Brooklyn.....	175,000
Oct. 9, The City of New York, 7 per cent. bonds.....	150,000
Dec. 17, The City of Brooklyn, 7 per cent. bonds.....	50,000
1874.	
Jan. 2, The City of Brooklyn, 7 per cent. bonds.....	48,000
Jan. 2, The City of Brooklyn, cash.....	28,000
Jan. 12, Hugh Smith.....	16,800
Total.....	\$3,813,200
Amount as per statement of May 1, 1873.....	3,684,600
Total.....	\$1,128,600

The company, on the 1st of May, 1874, found themselves in debt, the total amount expended being \$4,366,153.52. The Brooklyn tower had risen 222 feet above high water, the New York tower 122 feet, and the Brooklyn anchorage was 6 feet above the surface. By far the larger proportion of the money thus far contributed had been obtained from this city and Brooklyn, which, by the act of 1869, was entitled to representation in the Board of Directors—this city by its Mayor, Controller and President of the Board of Aldermen, and Brooklyn by its Commissioners of the Sinking Fund. The period fixed for the completion of the bridge was on the 1st of June, 1874, and as it was evident that it could not be completed on that date, additional legislation was needed. The stockholders other than the two cities were averse to contributing further, and work was arrested for a time. On June 5, 1874, an act was passed providing that the two cities might, by a vote of their Common Councils, buy out the other stockholders and become sole proprietors of the bridge by repaying the amount subscribed, with interest from the time of payment, and that then the Board of Directors of the New York Bridge Company should consist of 20 members, to be appointed as follows: The Mayor and Controller of New York and the Mayor and Controller of Brooklyn, each to appoint eight directors and to be themselves members of the board by virtue of their offices. This said board was given the power to levy such toll on the bridge travel, when completed, as should be deemed expedient, and the income was to be applied to the payment of the principal and interest of all the bonds issued, and the cities were authorized to issue bonds in addition to the amounts previously subscribed—this city, \$500,000 a year for 1874 and 1875, and Brooklyn double the amount in the same year.

Further legislation on May 14, 1875, provided for the dissolution of the old company whenever two-thirds of the private stock had been thus purchased by the two cities, and that the trustees might call on the two cities for whatever amounts were necessary for the prosecution of the work to the amount of \$3,000,000, or restricted them to a call of \$1,000,000 a year from this city and \$2,000,000 a year from Brooklyn. It was also provided that if any of the private stockholders refused to sell their stock, it could be acquired in the manner provided for in the taking of land.

The necessary action was obtained in the Common Councils of both cities, and the private stockholders were for the most part only too glad to receive back the money that they had subscribed, with the interest added. It was not, however, until June 9, 1875, that the direction of the bridge was vested in the Board of Trustees appointed by the two cities. Money for the continued prosecution of the work had, however, been received from time to time from this city and from Brooklyn, so that the total receipts from all sources up to that date amounted to \$5,487,937.27, and there had been expended \$5,388,646.06.

The Brooklyn tower was finished about the middle of June, 1875. At the close of that year the New York tower had been carried up to a height of 240 feet and was finished in 1876. Early in 1875 the property on which New York anchorage is erected was acquired by the Bridge Company and the work of excavating for the foundation began. Great difficulty was experienced in this work on account of the swampy nature of the ground, and expensive pumping apparatus had to be employed to free the pit from water while the work was in progress. At about the depth of high water an old dock was uncovered, the logs of which it was composed being from 6 to 30 inches in diameter, and perfectly sound after their long burial, thus confirming the theory of the engineers, that the timber in the caissons in which the towers rest is practically indestructible. The foundation was completed for this anchorage in August, 1875, and on December 16 the masonry had been raised to a height of 44 feet above tidal level. The dimensions of this anchorage are: Length over all at the base, 120 feet;

width at the front, 106 feet 4 inches, and at the rear, 116 feet 4 inches. The height of the roadway at the front is 89.04 feet and at the rear 85.24 feet. The anchorage was finished September 25, 1876. At the beginning of 1875 the Brooklyn anchorage had risen to a height of 62 feet. It was completed during that year as far as it could be preparatory to the cable making. Both towers and anchorages being complete, work was begun on the construction of the cables. The utmost care was exercised in making the contracts for the wire, so as to get that which was the very best. The machinery for making the cables was placed upon the Brooklyn anchorage, the plan proposed being to take the individual wires across the river one by one, and then bind them all together into one mass to form the cable. The wire used is what is called No. 8, 14 feet of which weighs one pound, each cable being composed of 6300 wires laid parallel, making, when bound together, a cable 15 inches in diameter. The main difficulty was to get the first wire across. The wire was upon a reel placed in a framework, so that it could revolve freely, and this reel was placed upon a scow at the foot of the Brooklyn tower. The end of the wire was taken up over the Brooklyn tower, and down into the yard in the rear of the tower. A manila rope had been drawn from the engine on the Brooklyn anchorage to the tower, and this was fastened to the end of the wire. The engine was then started, and the end of the wire was carefully drawn to the Brooklyn anchorage over the roofs of the intervening buildings. When it had been secured there the scow containing the reel was taken in tow, the wire running off the reel to the bottom of the river as she was towed to the New York side. Then all the remaining wire upon the reel was unwound and coiled in large bights upon the dock at the foot of the New York tower. When the end of it was reached it was hoisted to the top of the tower, and passed over it to the stone-throwing engine. It was then necessary to watch for a time when there was no vessel in the river in the way of the bight of the wire when it should be drawn from the water. Such a time was found, and on August 14, 1876, the first wire was successfully stretched across for the whole distance from the Brooklyn anchorage to the top of the New York tower. The end of the wire was then taken to the New York anchorage in the same manner that had been found successful upon the other side of the river. A second wire was taken over the next day, and the two were spliced together around driving wheels, forming an endless rope capable of being worked to and fro. Another "traveler" was taken over by being seized to the first at convenient distances, and then what was called a "carrier" was taken over by the scow in the same manner as the first wire. So, gradually, the means of communication were enlarged, and on the 25th of August, 1876, Mr. E. F. Farrington, the master mechanic of the company, was able to cross the river in what is called a "buggy," on one of the travelers. Then the detail of the work went on, each day adding to the number of wires from tower to tower, until finally a light foot-bridge was run across, and all who desired and could obtain the necessary permission, could walk at will from one anchorage to the other over the tops of the towers and across the river. Then the "cradles," ten in number, were got in position, so that the men engaged in the cable-making could regulate the wires, and the work of making the cables went on uninterruptedly until their completion in 1879. The property for the approaches was, for the most part, acquired by the mandate of the court, as provided for in the charter, and in the building of the approaches on either side of the river many old landmarks have been removed, the most notable being St. Ann's P. E. Church, on the corner of Washington and Prospect streets, in

Brooklyn. The work has been delayed somewhat by refusals, on the part of those having charge of the finances of the cities, to supply the money needed, and in April, 1880, additional legislation was obtained from the Legislature providing for an additional appropriation for the completion of the work. The work on the approaches has been continued until, on both sides of the river, they are nearly completed. Next spring the work of building the roadway will begin, and it is expected that the work will be completed and the bridge opened for traffic by the end of the year.

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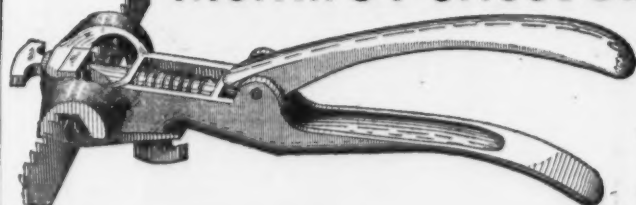
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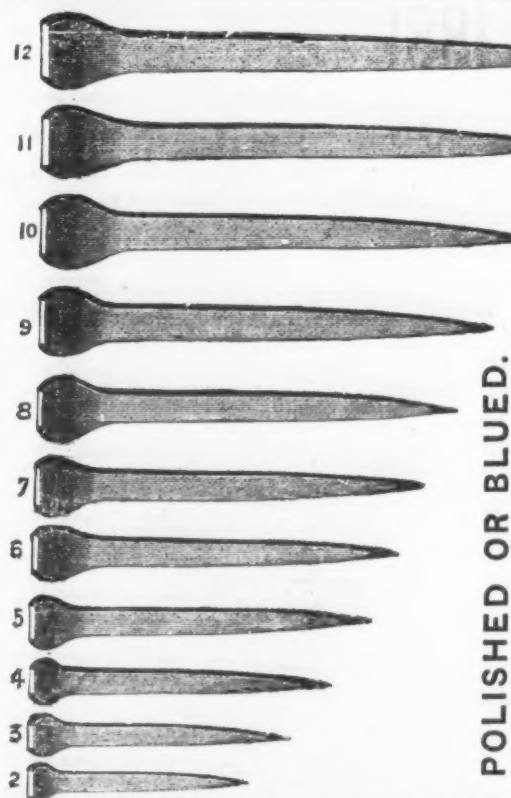
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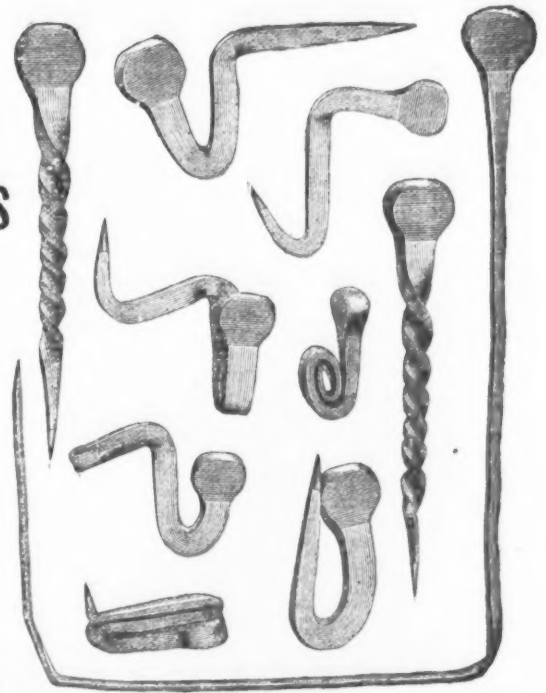
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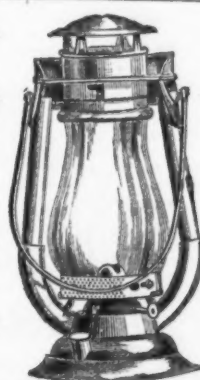
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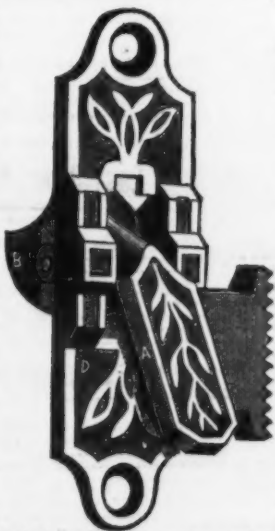


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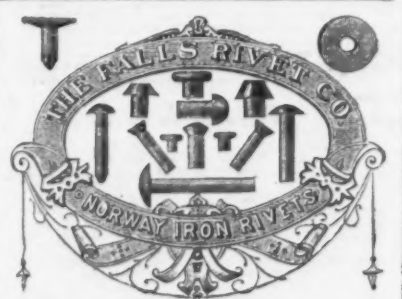
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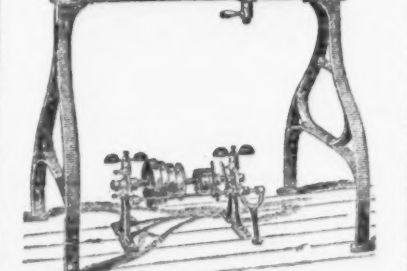
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" Douglas's ..... \$1.00 \$1.10 W gross-dis 24 1/2  
Brad No's, Aiken's ..... \$ dos \$1.00-dis 24 1/2  
" No. 4, \$1.00; No. 4 1/2, \$1.10; No. 5, \$1.20; No. 6, \$1.30; No. 7, \$1.40; No. 8, \$1.50; No. 9, \$1.60; No. 10, \$1.70; No. 11, \$1.80; No. 12, \$1.90; No. 13, \$2.00; No. 14, \$2.10; No. 15, \$2.20; No. 16, \$2.30; No. 17, \$2.40; No. 18, \$2.50; No. 19, \$2.60; No. 20, \$2.70; No. 21, \$2.80; No. 22, \$2.90; No. 23, \$3.00; No. 24, \$3.10; No. 25, \$3.20; No. 26, \$3.30; No. 27, \$3.40; No. 28, \$3.50; No. 29, \$3.60; No. 30, \$3.70; No. 31, \$3.80; No. 32, \$3.90; No. 33, \$4.00; No. 34, \$4.10; No. 35, \$4.20; No. 36, \$4.30; No. 37, \$4.40; No. 38, \$4.50; No. 39, \$4.60; No. 40, \$4.70; No. 41, \$4.80; No. 42, \$4.90; No. 43, \$5.00; No. 44, \$5.10; No. 45, \$5.20; No. 46, \$5.30; No. 47, \$5.40; No. 48, \$5.50; No. 49, \$5.60; No. 50, \$5.70; No. 51, \$5.80; No. 52, \$5.90; No. 53, \$6.00; No. 54, \$6.10; No. 55, \$6.20; No. 56, \$6.30; No. 57, \$6.40; No. 58, \$6.50; No. 59, \$6.60; No. 60, \$6.70; No. 61, \$6.80; No. 62, \$6.90; No. 63, \$7.00; No. 64, \$7.10; No. 65, \$7.20; No. 66, \$7.30; No. 67, \$7.40; No. 68, \$7.50; No. 69, \$7.60; No. 70, \$7.70; No. 71, \$7.80; No. 72, \$7.90; No. 73, \$8.00; No. 74, \$8.10; No. 75, \$8.20; No. 76, \$8.30; No. 77, \$8.40; No. 78, \$8.50; No. 79, \$8.60; No. 80, \$8.70; No. 81, \$8.80; No. 82, \$8.90; No. 83, \$9.00; No. 84, \$9.10; No. 85, \$9.20; No. 86, \$9.30; No. 87, \$9.40; No. 88, \$9.50; No. 89, \$9.60; No. 90, \$9.70; No. 91, \$9.80; No. 92, \$9.90; No. 93, \$10.00; No. 94, \$10.10; No. 95, \$10.20; No. 96, \$10.30; No. 97, \$10.40; No. 98, \$10.50; No. 99, \$10.60; No. 100, \$10.70; No. 101, \$10.80; No. 102, \$10.90; No. 103, \$11.00; No. 104, \$11.10; No. 105, \$11.20; No. 106, \$11.30; No. 107, \$11.40; No. 108, \$11.50; No. 109, \$11.60; No. 110, \$11.70; No. 111, \$11.80; No. 112, \$11.90; No. 113, \$12.00; No. 114, \$12.10; No. 115, \$12.20; No. 116, \$12.30; No. 117, \$12.40; No. 118, \$12.50; No. 119, \$12.60; No. 120, \$12.70; No. 121, \$12.80; No. 122, \$12.90; No. 123, \$13.00; No. 124, \$13.10; No. 125, \$13.20; No. 126, \$13.30; No. 127, \$13.40; No. 128, \$13.50; No. 129, \$13.60; No. 130, \$13.70; No. 131, \$13.80; No. 132, \$13.90; No. 133, \$14.00; No. 134, \$14.10; No. 135, \$14.20; No. 136, \$14.30; No. 137, \$14.40; No. 138, \$14.50; No. 139, \$14.60; No. 140, \$14.70; No. 141, \$14.80; No. 142, \$14.90; No. 143, \$15.00; No. 144, \$15.10; No. 145, \$15.20; No. 146, \$15.30; No. 147, \$15.40; No. 148, \$15.50; No. 149, \$15.60; No. 150, \$15.70; No. 151, \$15.80; No. 152, \$15.90; No. 153, \$16.00; No. 154, \$16.10; No. 155, \$16.20; No. 156, \$16.30; No. 157, \$16.40; No. 158, \$16.50; No. 159, \$16.60; No. 160, \$16.70; No. 161, \$16.80; No. 162, \$16.90; No. 163, \$17.00; No. 164, \$17.10; No. 165, \$17.20; No. 166, \$17.30; No. 167, \$17.40; No. 168, \$17.50; No. 169, \$17.60; No. 170, \$17.70; No. 171, \$17.80; No. 172, \$17.90; No. 173, \$18.00; No. 174, \$18.10; No. 175, \$18.20; No. 176, \$18.30; No. 177, \$18.40; No. 178, \$18.50; No. 179, \$18.60; No. 180, \$18.70; No. 181, \$18.80; No. 182, \$18.90; No. 183, \$19.00; No. 184, \$19.10; No. 185, \$19.20; No. 186, \$19.30; No. 187, \$19.40; No. 188, \$19.50; No. 189, \$19.60; No. 190, \$19.70; No. 191, \$19.80; No. 192, \$19.90; No. 193, \$20.00; No. 194, \$20.10; No. 195, \$20.20; No. 196, \$20.30; No. 197, \$20.40; No. 198, \$20.50; No. 199, \$20.60; No. 200, \$20.70; No. 201, \$20.80; No. 202, \$20.90; No. 203, \$21.00; No. 204, \$21.10; No. 205, \$21.20; No. 206, \$21.30; No. 207, \$21.40; No. 208, \$21.50; No. 209, \$21.60; No. 210, \$21.70; No. 211, \$21.80; No. 212, \$21.90; No. 213, \$22.00; No. 214, \$22.10; No. 215, \$22.20; No. 216, \$22.30; No. 217, \$22.40; No. 218, \$22.50; No. 219, \$22.60; No. 220, \$22.70; No. 221, \$22.80; No. 222, \$22.90; No. 223, \$23.00; No. 224, \$23.10; No. 225, \$23.20; No. 226, \$23.30; No. 227, \$23.40; No. 228, \$23.50; No. 229, \$23.60; No. 230, \$23.70; No. 231, \$23.80; No. 232, \$23.90; No. 233, \$24.00; No. 234, \$24.10; No. 235, \$24.20; No. 236, \$24.30; No. 237, \$24.40; No. 238, \$24.50; No. 239, \$24.60; No. 240, \$24.70; No. 241, \$24.80; No. 242, \$24.90; No. 243, \$25.00; No. 244, \$25.10; No. 24

[illegible][illegible]

Hammer, Baylone's	.....	dis 25
Hammond (new list July 20, '00).....	dis 20	
Hammison & Beckley.....	dis 50	
Hammer, Sargent's	dis 25	
Hammer, Sargent's, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 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618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 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2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225,		

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Best Warranted Cast Steel for Machinists' Tools,

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Extra Mild Center Steel, special for Taps,

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Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,  
TABLE AND POCKET CUTLERY, TOOLS, TAPS AND DIES; also for COLD ROLLED STEEL for  
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A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

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WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN

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Cincinnati Branch,

GEORGE KINSEY, Manager,

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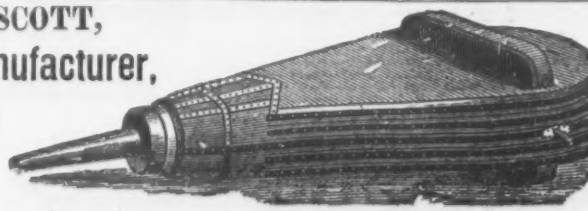
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**Special Steel**

FOR

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Turns out at least double work by increased speed and 100% and cuts harder metals than any other steel. Neither hardening nor tempering required.

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All the regular sizes in stock, with Nozzles to fit  
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For Boilers, Fire-boxes, &amp;c.

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Iron and Steel Merchants,

Exporters of Iron and Steel Rails, Blooms, Spie-

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Iron Ore, &amp;c. Sole agents for the sale of the Vena

Dulce (Sonderstr.) Iron Ore from the Magdalena

Mine. Shipping Port: Bilbao.

Analysis of "Magdalena" Ore.

Silica	4.05
Peroxide of Iron	84.60
Oxide of Manganese	1.65
Alumina	1.84
Lime	0.33
Magnesia	0.008
Phosphoric Acid	0.04
Sulphuric Acid	0.42
Combined Water	5.97
Moisture	0.43
	100.43

Metallic Iron

The Sulphuric Acid exists as Sulphate of Lime,

and is, in my opinion, not detrimental.

Signed, E. D. RILEY, F. C. S.

Cable address:

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**Walter R. Wood,**

**GRINDSTONES.**

Berea, O., Nova Scotia, &amp; other brands

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**GEO. CHASE,**

The largest manufacturers in the world of

**OIL STONE**

Of all descriptions.

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Send for Illustrated Price List. NEW YORK.

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Importers and Dealers in

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Stones for Machinists, Carpenters, Farmers and

Glass Cutters constantly on hand and cut to order.

**PURE EMERY,**

Manufactured from

The Finest Turkish Ore

BY CHARLES ALDEN.

Consumers will find it to their interest to apply

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Assorted Sizes Always on Hand.

Quality, grades and prompt execution of orders

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**ASHLAND EMERY CO.**

CHARLES ALDEN, MANAGER.

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Send for quotations and samples.

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**THE EDGAR THOMSON STEEL CO.,**  
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MANUFACTURERS OF



General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.

New York Office, 57 Broadway.

The Company warrants its rails equal in quality to any manufactured in the United States.  
Branch Office and P. O. Address, No. 48 Fifth Ave., Pittsburgh, Pa.  
THOS. M. CARNEGIE, Chairman. D. A. STEWART, Sec'y and Treas.

**North Chicago Rolling Mill Co.**

ESTABLISHED 1857. CAPITAL \$3,000,000. INCORPORATED 1856.

Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

MERCHANT BAR, FISH PLATES, PIG METAL,  
IRON RAILS & BESSEMER STEEL RAILS.

CAPACITY OF WORK:	Fish Plates.....	20,000 tons
	Merchant Bar.....	10,000 "
	Pig Metal.....	50,000 "
	Iron Rails.....	50,000 "
	Steel Rails.....	50,000 "
	Total Capacity per year.....	200,000 "

OFFICES:

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37 Mitchell Block, Milwaukee, Wis.

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**SOHO IRON MILLS.**  
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MANUFACTURERS OF

**GALVANIZED SHEET IRON,**

Juniata, Charcoal and Common.

**Sheet & Plate Iron,**

and Special Sizes for Sap Pans.

PITTSBURGH, - - - PENN.

FIRST QUALITY.

SECOND QUALITY



## NOTICE.

Hereafter our GALVANIZED SHEET IRON will be branded as per cuts in margin. We have adapted these



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to protect ourselves and the trade against imitations of our iron, as was the case under our old brands.

MOORHEAD & COMPANY  
SOHO MILLS  
PITTSBURGH.

MOORHEAD &amp; CO.

THIRD QUALITY

as heretofore.

REFINED.

January 1, 1881.



For Coal and Ore Separators, Revolving Screens, Jigs, Washers, Stamp Batteries, Mining and Smelting Works, Silver Reduction and Concentrating Works, etc., etc.  
For Centrifugals, Brewing, Distilling, Wool and Sugar Machinery, Purifier Trays for Gas Works, Coal and Coke Works, Flour, Cotton, Oil, Paper and Pulp Mills, etc.  
Iron, Steel, Copper, Brass, Zinc and other metals punched to any size and thickness, for all uses.

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Nos. 43, 45 and 47 South Jefferson St., CHICAGO, ILL.

Special discounts to the trade. Correspondence solicited.

**Philadelphia Smelting Co.,**

S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.

**GENUINE BABBITT,**

Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.

**DEOXIDIZED BRONZE,**

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

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"Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used.  
Very truly,  
HENRY DIXON & SONS.

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French Points,

Window Shade Nails,

Upholstering, **WAGON NAILS**, Molding Nails,

(Sample Cards sent on application.)

Electrotype,

Roofing Nails,

Barbed Caster Nails.

Veneer Nails, Label Tacks and small Nails of all kinds, Cabinet Nails, Barbed Lock Nails, Cigar Box Nails, &c., &c., put up in bulk, 5 lb. packages, papers, or as wanted.

**AMERICAN WIRE NAIL CO.**

Factory, Fifteenth and Madison Sts.

COVINGTON, KY.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

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## SPECIAL FEATURES.

**Notes of Novelties.**—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.  
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## SUBSCRIPTIONS

to the Ironmonger and Metal Trades' Advertiser, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful Ironmongers' Diary and Text Book, a work sold to subscribers at 75 cents.

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This is an annual, presented free to every subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

## THE FOREIGN SUPPLEMENT

is published every fourth week in connection with the extensive and world-wide circulation of the Ironmonger itself. The dates of its publication for the next twelve months will be as follows:

FEBRUARY 5, MARCH 5, APRIL 5 and 30, MAY 28, JUNE 25, JULY 23, AUGUST 20, SEPTEMBER 17, OCTOBER 8, NOVEMBER 4, DECEMBER 3 and 31.

This Supplement is published in

## FIVE LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the Ironmonger not only within reach out in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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## THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the Ironmonger and Foreign Supplement is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

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Established 1845.  
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Stove Linings,  
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Manufacturers

**FIRE BRICK**

Edge Pressed Furnace Blocks,  
CLAY RETORTS, TILES, &c.,  
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Twenty years' practical Experience.

**PERTH AMBOY TERRA COTTA CO.,**

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Manufacturers of Clay Retorts, Fire Brick,  
Gas House and other Tile.  
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ESTABLISHED 1856.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey.  
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Fire Clays, Fire Sand, and Kaolin for Sale.

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Excelsior Fire Brick & Clay  
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Manufacturers of FIRE BRICK, HOLLOW  
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WORKS: PERTH AMBOY, NEW JERSEY.  
Office & Depot, 418 to 422 East 23d St., N. Y.

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**JAMES OSTRANDER & SON,**  
ESTABLISHED 1848,  
Manufacturers of  
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Established 1864.  
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STANDARD SAVAGE FIRE BRICK,  
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OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and  
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Cotton and "Long Flax" Sull Duck,  
Cotton and Linen Ravens,  
Creed's Patent Ship's Clews, Helman's Wire Rope  
Splices, Agent for Raymond's American Crane Oil  
for Lubricating Cylinders and Valves.

**WILLIAM H. AINLEY,**  
Chairman.  
**PETER D. WANNER,**  
Sec. and Treas.  
**Mellert Foundry & Machine Co.,**  
Limited.  
(Works Established at Reading, Pa., in 1848.)  
Manufacturers of

**CAST IRON WATER & GAS PIPE**  
Specials: Flange Pipe, Retorts, Valves and Hydrants,  
Lamp Posts, &c. The Improved Canadian Turbine  
Water Wheel, Machinery and Castings  
for Furnaces, Rolling Mills, Grist and Saw Mills, Min-  
ing Pumps, Hoists, &c. Columns, Brackets, Iron  
Railings, &c.  
**ARNOLD MELLERT, Supt., Reading, Pa.**

**HENRY DISSTON & SONS,**

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA.

The cut shown herewith represents our

**STAR SAW SET,**

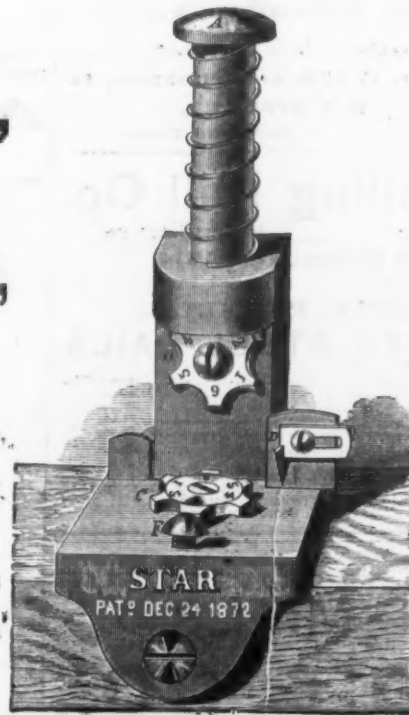
which is unequalled for simplicity, durability and accuracy in

Setting all kinds of Hand Saws, Web Saws,  
Wood Saws, Back Saws.

We guarantee this tool to do the work for which it is in-  
tended, if properly used; if it does not, the money will be re-  
funded and the tool can be returned at our expense.

We have long felt the need of a Saw Set that would set  
the teeth of a saw without breaking, and at the same time can  
be worked by anybody.

In the Star Set the same principle is involved as is used in  
our works for setting saws.

**THE "WARNER" DOOR SPRINGS**

are the most simple, most effective and most convenient ever introduced, and the immense sale we  
are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a  
uniform pressure, holding the door tight when closed, and allowing it to open without increasing the  
pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also  
from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

No. 2 For Medium Doors.

No. 3 For Heavy Doors.

They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

**FREDERIC BARTLETT,**  
FREEPORT, ILLINOIS.

**CHAMPION ONE-MAN SAW**

WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw.  
We make the following lengths, 3 1/2, 4, 4 1/2, 5 feet. Send for sample.

**WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.**



**NEW MAKE OF MINE LAMP.**  
THREE DIFFERENT SIZES SPOTS  
SEAMLESS BRASS COLLAR, BRASS HINGE, Solid Lid, NO SOLDERING THE HINGE CANNOT MELT OFF  
SEND 15 CENTS FOR SAMPLE TO  
**LEONARD BROS., Scranton, Pa.**

**WHITE ANCHOR FIRE HOSE,**

FOR FIRE PROTECTION IN

Manufacturing Establishments.

This Hose is in use in over 300 Fire Departments; weighs but 58 pounds to the sec-  
tion of 50 feet; will stand a pressure of 400 pounds to the square inch; guaranteed for  
three years; will retain its strength for many years. We have many testimonials show-  
ing continuous service for nine years, where the hose is in good condition for fire service.  
For sample and price, address

**AKRON RUBBER WORKS, Akron, Ohio.**

PROPRIETORS OF

**NORTH CAROLINA HANDLE CO.**



MANUFACTURERS OF  
**Handles and Spokes,**  
79 Reade Street and 97 Chambers Street, NEW YORK.  
HARDWARE COMMISSION MERCHANTS.

**John T. Lewis & Bros.**  
No. 231 South Front St.,  
PHILADELPHIA.



TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge,  
Orange Mineral, Linseed Oil,  
AND PAINTERS' COLORS.

**Brooklyn White Lead Co.**



TRADE MARK

**White Lead, Red Lead & Litharge.**  
No. 182 Front Street,  
NEW YORK.

**JOHN JEWETT & SONS,**  
Manufacturers of the well-known brand of  
**WHITE LEAD.**



TRADE MARK.

ALSO MANUFACTURERS OF

**LINSEED OIL.**

182 Front Street, NEW YORK.



TRADE MARK.

**The Atlantic White Lead and Linseed Oil Co.,**

MANUFACTURERS OF

White Lead (Atlantic), Red Lead,  
Litharge & Linseed Oil.  
**ROBERT COLGATE & CO.,**  
287 Pearl Street, New York.



**DUNBAR BROS.,**

Manufacturers of

**Clock Springs and Small Springs**  
of every description, from best Cast Steel  
**BRISTOL, CONN.**

**The Morris Sash Lock Mfg. Co.,**  
Manufacturers of

The Morris Sash Lock,  
Pat. Combined Sash Lift & Lock,  
Pat. Self Locking Shutter Bar,  
And specialties in Builders' Hardware.  
214 and 216 ELM STREET, CINCINNATI, OHIO, U. S. A.

**THOMAS MORTON,**  
65 Elizabeth Street, New York.  
Manufacturer of Copper and Iron  
**SASH CHAINS,**

With Patent Attachments.  
Warranted for years. Chains of any size made to  
order, and trade supplied with liberal discount.

## PHILADELPHIA.

(Corrected Weekly by Lloyd, Supple & Walton.)  
 Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

## Anvils.

Peter Wrights, 100 lbs. \$10.00  
 Over 250 lbs. 100 lbs. \$10.00  
 Eagle (American) 100 lbs. \$10.00

## Apple Parers.

Keystone Centennial, 1876. \$4.15  
 Reading No. 72. 1877. 5.00  
 No. 74. 5.00  
 No. 75. 5.00  
 No. 76. 5.00  
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## Rotary Peach Parers.

Lot of 10 to 25 dozen special prices.

## Axes.

Hunt's Kentucky and Yankee. per doz \$11.00  
 Mann's Red Warrior. 11.00  
 Richland Chief. 10.00  
 Beveled Axes. add 50c  
 Double Bit Axes. 22.00

## Augers and Auger Bits.—New List January 1.

Bates' Nut Augers. 40c  
 Cook's Augers. 40c  
 Watson's Ship Augers. 40c  
 Benjamin Pierce Auger Bits. 40c  
 Griswold Auger Bits. 40c  
 Cook's Augers. 40c  
 Johnson's Augers. 40c  
 Bonney's Pat. Hol. Augers. 40c  
 Stearns' Pat. Hol. Augers. 40c

## Belts.

Bevin Bros. Mfg. Co. Light Hand Belts. 60c  
 Swiss Pattern. 60c  
 Connell's Door Belts. 60c  
 Gt. Western & Kentucky Cow, new list. 60c

## Bolt and Nut.

Chambers' No. 1. for 1/2 inch. 60c  
 No. 2. 60c  
 No. 3. 60c  
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## Boring Machines.

Upright, without Augers. 60c  
 Angular, without Augers. 60c

## Boles.—Eastern Carriage Boles.

Philadelphia. 60c  
 Stanley, Wrought Shutter. 60c

## Braces.—Barber's.

Backus. 60c  
 Suffolk. 60c  
 American Nail. 60c

## Butts.—Cast Fast Joint, Narrow.

Cast Loose Joint, Narrow. 60c  
 Acorn Loose Pin. 60c  
 Mayer's Loose Joint. 60c  
 Wrought Loose Pin. 60c  
 Table Hinges and Back Flaps. 60c  
 Narrow Fast. 60c  
 Loose Joint. 60c

## Blind Butts.

Parker. 60c  
 Clark. 60c  
 Shepard. 60c  
 Lull & Porter. 60c  
 Huffer's. 60c

## Chains.—German Halter and Coll. new list Oct. 22.

1879. 60c  
 Galvanized Pump. 60c  
 Best Proof Coll Chain—English. 60c

## Chisels.—Socket Framing.

Socket Framing. 60c  
 Butcher's. 60c  
 Casters.—Bed (new list July 1, 1880). 60c  
 Plates. 60c  
 Coffee Mills.—Box and Side, new list Jan. 1. 60c  
 Enterprise. 60c  
 Cutlery.—Walden Pocket, new list net  
 Landers, Frary & Clark. 60c  
 Goodnow Mfg. Co. and Meriden Cutlery Co. Manu-  
 facturers' prices net.

## Drawing Mfg. Co.

Adjustable Handle. 60c  
 Fry Press. 60c  
 Tinned. 60c  
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## Files.

Nicholson. 60c  
 Butcher. 60c  
 Spencer. 60c  
 E. M. Boynton. 60c

## Fluting Machines.

Eagle. 60c  
 Crown. 60c  
 Geneva Fluter. 60c  
 Favorite com. Fluter & Sd Iron. 60c

## Hammers.

Yorkes & Plumb's, new list. 60c  
 Flanders. 60c  
 Boynton's Pat. Saw Hammers. 60c  
 Hatchets. 60c  
 Yorkes & Plumb, new list. 60c  
 Hunt. 60c

## Hinges.

Strap and T. 60c  
 Horse Nails. 60c  
 Ausable. 60c  
 Blue and Pointed. 60c  
 Globe. 60c  
 Clinton. 60c  
 Polished & Pointed. 60c  
 Porter, all sizes. 60c  
 Discount on Ausable and Clinton, 30c; Globe, 10c

## Locks and Knobs.

Brantford. 60c  
 Gardner Cabinet. 60c  
 American Padlocks. 60c  
 Scandinavian Padlocks. 60c  
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## Lanterns.

Nail City. 60c  
 Square Candle and Oil. 60c  
 Tubular. 60c  
 Globes, 3c extra per doz. net.

## Lawn Mowers.—Pennsylvania.

Philadelphia. 60c  
 Excelsior. 60c

## Lawn and Garden Pumps.

Holland Patent. 60c  
 Molasses Gates. 60c  
 Enterprise Mfg. Co.'s Measuring Faucets. 60c  
 Stebbins' Gates. 60c  
 Lincoln's. 60c  
 Landers, Frary & Clark's Petroleum. 60c  
 Brass Liquor Cocks, new list Jan. 1, 1881. 60c  
 Cork Lined. 60c  
 Heat Cutters.—Pennsylvania. 60c  
 Dixon's. 60c  
 Woodruff. 60c  
 Browne. 60c  
 Hale's. 60c  
 American. 60c  
 Stafford. 60c  
 Enterprise. 60c  
 Finnes.—Ohio Tool Co. 60c  
 Scotland. 60c  
 Auburn. 60c  
 New York Tool Co. 60c  
 Bailey. 60c  
 Plane Irons.—Ohio Tool Co. 60c  
 Butcher's. 60c  
 Flanders. 60c  
 Stanley's Adjustable. 60c  
 Stanley's Non-Adjustable. 60c  
 Pumps.—Bickford. 60c  
 Rules.—Stanley Boxwood. 60c  
 Stanley Ivory. 60c  
 Steadyards.—Hart's Pattern. 60c  
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## Squares.

Steel and Iron. 60c  
 Try Squares. 60c  
 and Sharpened. 60c  
 Scythes.—Golden Clipper, Damascus Blade, Boxed  
 and Sharpened. 60c  
 Clipper No. 10, Boxed Blade, Boxed  
 and Sharpened. 60c  
 Saws.—Dixon's Hand, Panel and Rip. 60c  
 Dixon's Circular. 60c  
 Cross-Cut No. 2, Plain Tooth. 60c  
 Patent Tooth. 60c  
 Boynton's Lightning Cross Cut, new list. 60c  
 One Man, all lengths. 60c  
 Billet Web, 30 inch. 60c  
 Lightning Buck Saw, cross bar. 60c  
 Hand, Panel and Rip. 60c

## Shovels and Spades.

Rowland. 60c  
 Oliver Ames & Sons, new list. 60c  
 Grindings. 60c  
 and Irons. 60c  
 Mrs. Potts' Patent. 60c  
 Stone.—Arkansas Oil Stone. 60c  
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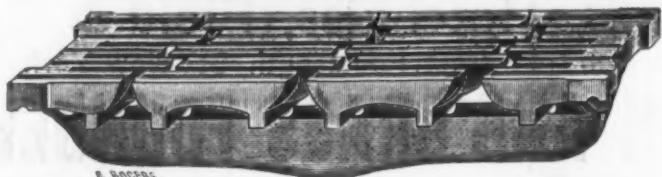
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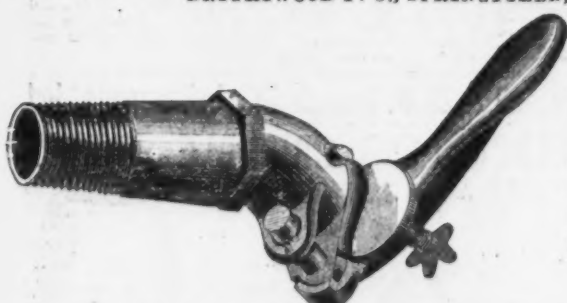
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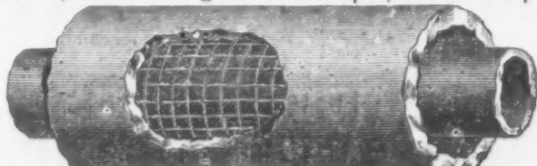
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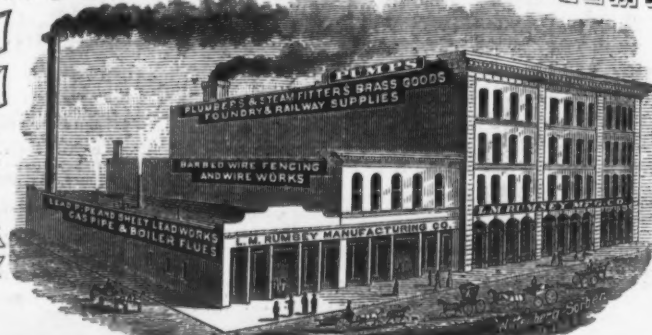
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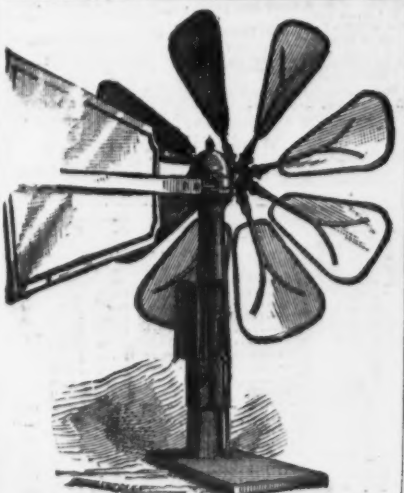
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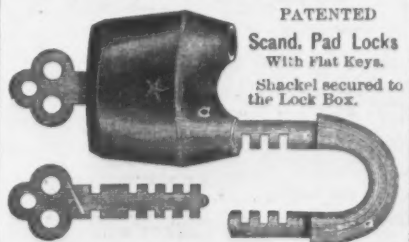
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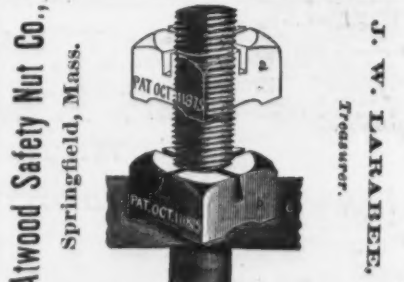
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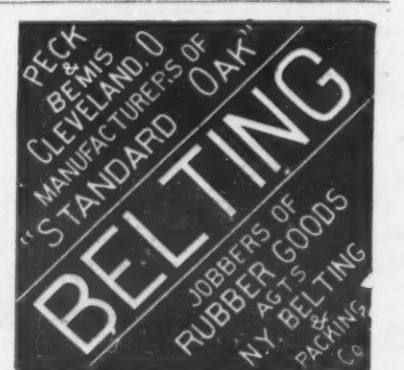
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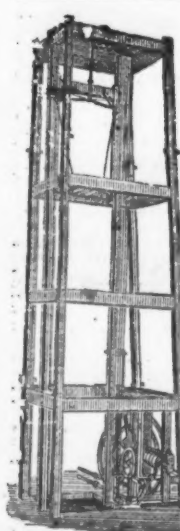


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No. 4 " " "  $1\frac{1}{2}$  to 3  
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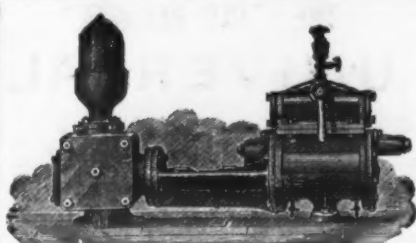
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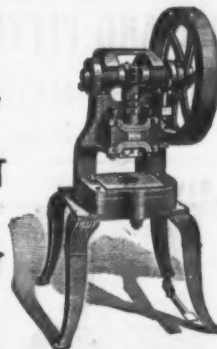
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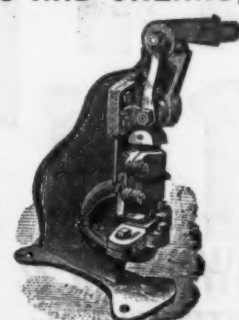
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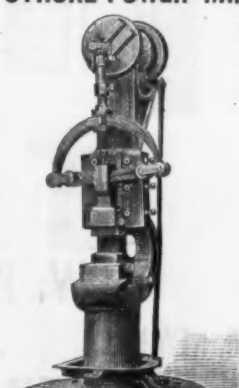
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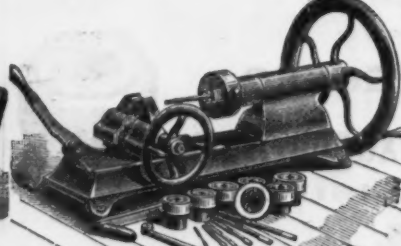
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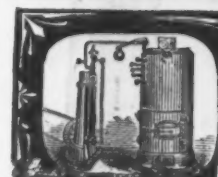
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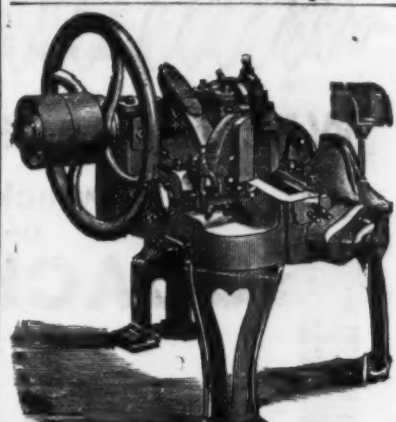
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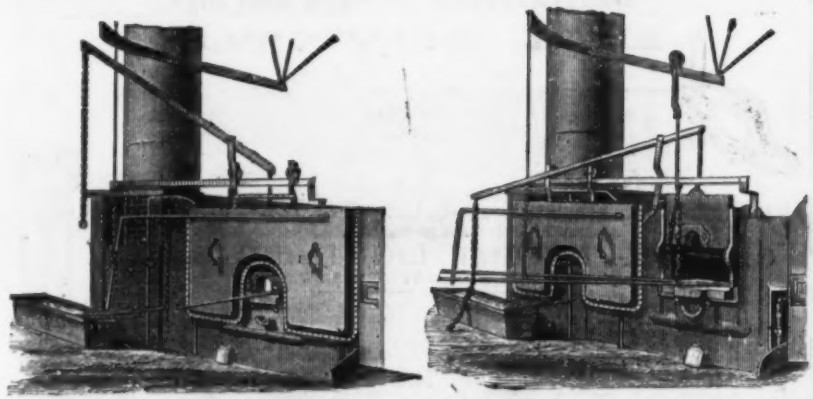
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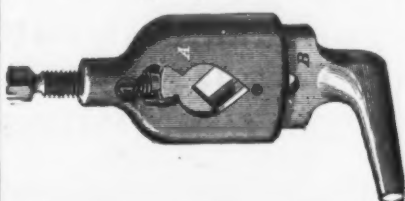
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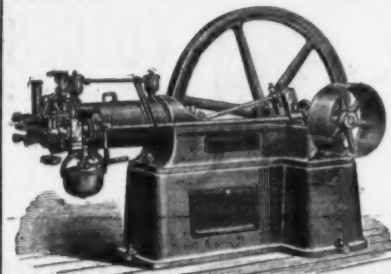
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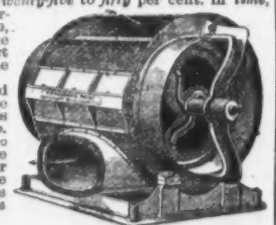
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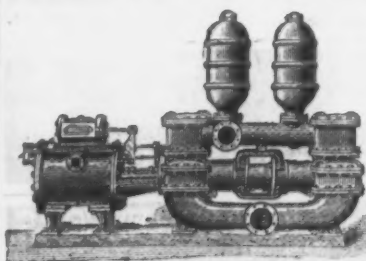
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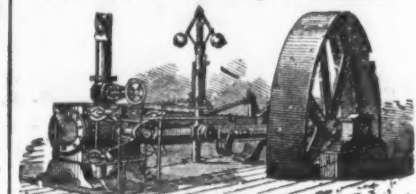
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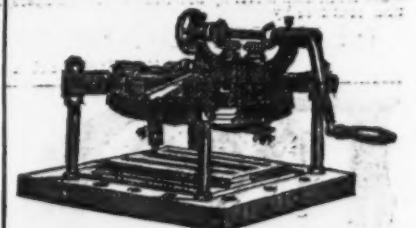
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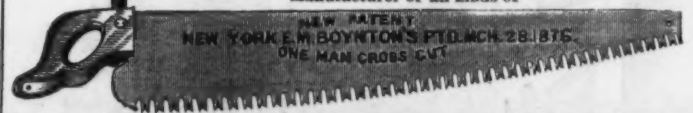
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